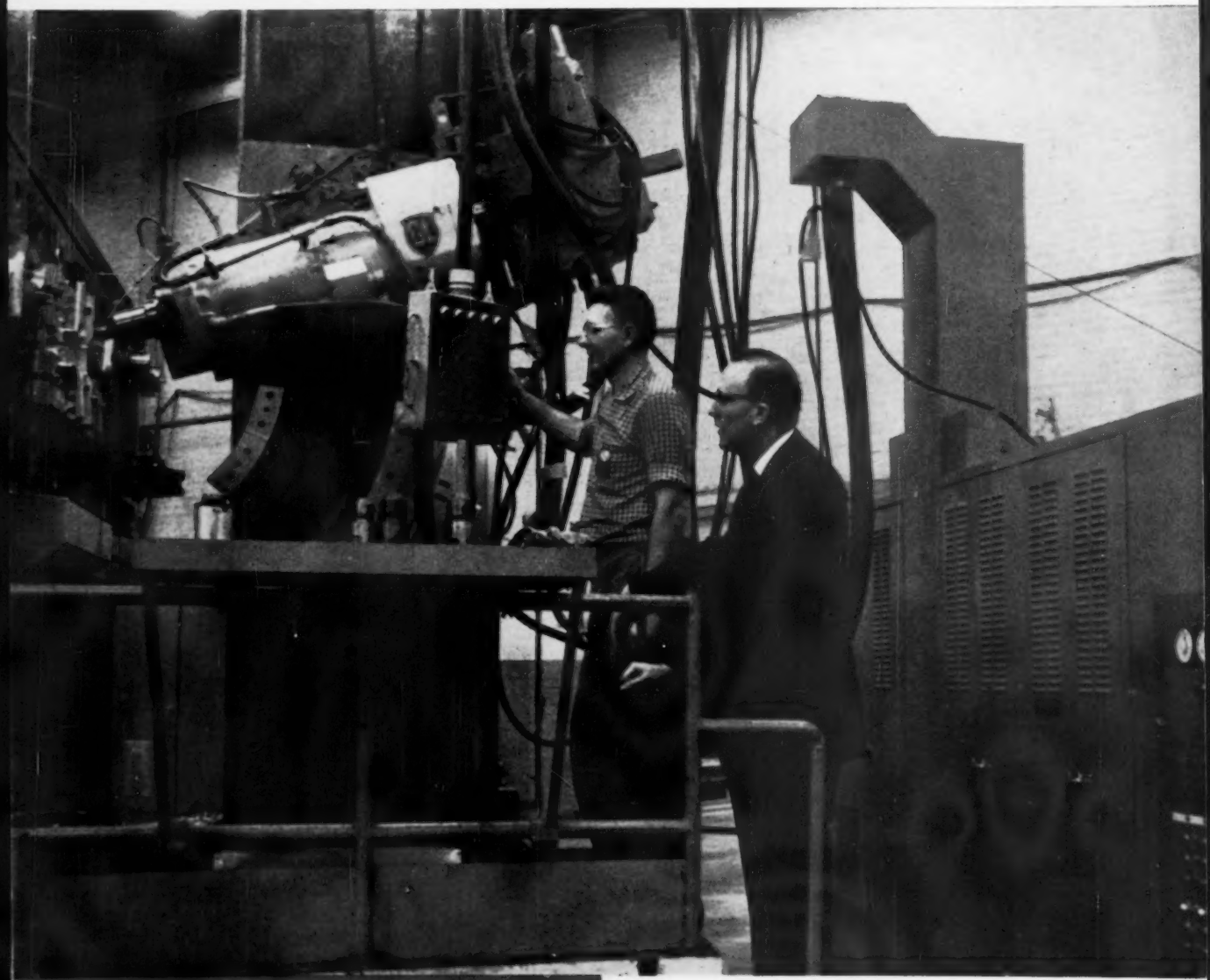
The IRON AGE

March 10, 1960 A Chilton Publication The National Metalworking Weekly



Low Merrim

Tape Machining at Republic Aviation:

Are Numerical Controls Headed For Breakthrough? P. 79

New Steel Districts And Capacities – P. 89

Russian Output Threatens World Tool Markets – P.121

Digest of the Week – P. 2-3

Photo courtesy of Heintz Division—Kelsey Hayes Corporation

Aristoloy meets severe cold extruding requirements on track bushings for Caterpillar Tractor Company

On the backward extrusion of this track bushing a 3 x 5-inch hollow blank is extended to 8 inches in a single blow. For uninterrupted flow of production, chemical and physical uniformity of the material is essential.

On thousands of parts Aristoloy electric furnace steel has fulfilled the stern production requirements of cold extruding.

Controlled melting of selected scrap, careful rolling and precise heat treating and finishing, this is why Aristoloy is so ideally suited to high volume production where rejects caused by material faults and deficiencies can be so costly.

For complete information about Aristoloy leaded or standard carbon, alloy and stainless grades, call the Copperweld representative in your nearest large city . . . or write today for NEW PRODUCTS & FACILITIES CATALOG.

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COPPERWELD STEEL COMPANY

ARISTOLOY STEEL DIVISION • 4001 Mahoning Ave., Warren, Ohio • EXPORT: Copperweld Steel International Co., 225 Broadway, New York 7, N. Y.

The products illustrated are made by The Animal Trap Co., Lititz, Pa., a regular user of Bethlehem wire.

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Whether you want to trap animals or catch customers, you can count on Bethlehem for top-quality specialty steel wire. Wire for animal traps, flexible shafts, rotisserie spits, welding, screw drivers, or hose-reinforcement . . . these are just a few of hundreds of uses for Bethlehem specialty wire.

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The IRON AGE

March 10, 1960—Vol. 185, No. 10

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News of the Industry

AUTO SALES

Enter Critical Period—Inventory pileups caused automakers to cut back production short of hoped-for

output of 2.25 million cars in first quarter. A 6.5 million car year is still possible if sales "explode" this spring, they say. P. 82

STEEL SPENDING

Gains Momentum—The steel industry should spend $1.6 billion for new plants and equipment this year. Some projects have been announced. P. 83

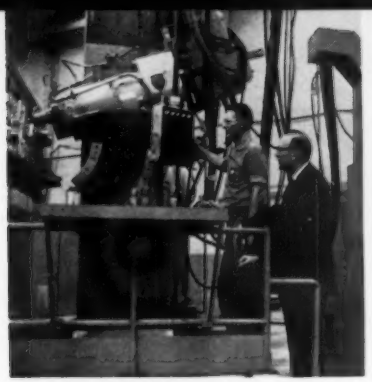
DEPRECIATION HEARINGS

Plea for Changes—Businessmen appearing before House Ways and Means Committee call for sweeping reform of depreciation tax rules. P. 84

LABOR MEDIATION

The Workload Grows—Federal Mediators struggled through a 35 pct increase in caseload in 1959. Wages led the issues. But job se-

Metalworking



Cover Feature

NUMERICAL CONTROLS: The future of numerically-controlled machine tools is taking form. This week's special feature points out new developments. Tape-controlled unit, cover, is examined by J. J. Childs, Republic Aviation. P. 79

curity for workers and management's drive for greater efficiency have become significant causes of strife. P. 85

WASHINGTON

Too Much—Confusion in Washington over what is going on in the space programs is resulting in a pretty embarrassing situation. P. 103

Engineering-Production Developments

RUSSIAN PRODUCTION

How Big a Threat?—Good quality machine tools are being mass produced in the Soviet Union. No other nation is doing this. The effect on world markets will be political as well as economic. One factory alone produces 1000 general-purpose lathes per month and sells them at rock-bottom prices. P. 121

PLASTIC RESINS

As Coatings or Foams — The mixing and spraying of plastic resins can be handled inside a single gun. It will even spray plastics that set within 4 seconds. Key to the setup is a pumping unit that meters the fluids to the gun which mixes and sprays the plastic coating with no time lag. P. 124

CAST STAINLESS ALLOY

Combines Two Traits—A newly-developed stainless alloy links high strength and good corrosion resistance. It also has good ductility when hardened, improved resistance to galling, and good machinability in both water-quenched and annealed states. P. 126

HYDRAULIC DESIGN

Ups Machine Performance—Here's a case where fluids and coolants couldn't be introduced by mechanical means. But two special designs in hydraulics gave the machine the smooth action needed. One was a hydraulic cylinder and the other a distributor gland. P. 130

STRUCTURAL BOLTING

Higher Strengths—Rows of spiral grooves on the upper shank of a new structural bolt produce a tight body-bound fit, insuring high shear resistance. After the bolt is driven through connecting steel beams, the fit locks the assembly to prevent slippage. P. 132

Market and Price Trends

WEST COAST

How to Expand Wisely—When companies in the Farwest feel the need to "go national," expansion at home may not be the best method. Some look for a plant close to east and midwest markets, others merge with eastern companies. P. 105

MACHINE TOOLS

Small-Lot Automation—A new trunnion-transfer unit is designed to make a "family" of parts rather than just one of them. It will let small plants cut costs without a big investment. P. 107

STEEL SUMMARY

Dropoff Coming—A surge of new cancellations of orders is bringing the dropoff of steel operations earlier than expected. Mills will soon have to gear operations to rate of orders. When that comes, operating rates will fall sharply. P. 169

PURCHASING

Trends in Scale Design—More industrial scale buyers are discovering the value of complete weighing systems. But sales of standard scales are also good as users improve and modernize equipment. P. 170

NEXT WEEK

SUPPLIER PROBLEMS

Industry Analyzed — In next week's special feature Dr. Malinowski and Dr. Kinnard of the University of Connecticut analyze the problems of metalworking's small suppliers. Conclusions are based on personal surveys.

TAPE CONTROL FOR MILL

Boosts Utility—Developed for a boring mill, a new tape control system advances utility of numerical control. Next week's technical feature tells how you can even have present jig mills refit.

REVERSOL 1133-5X

REG. U. S. PAT. OFF.

...a tough coolant

...for a tough job

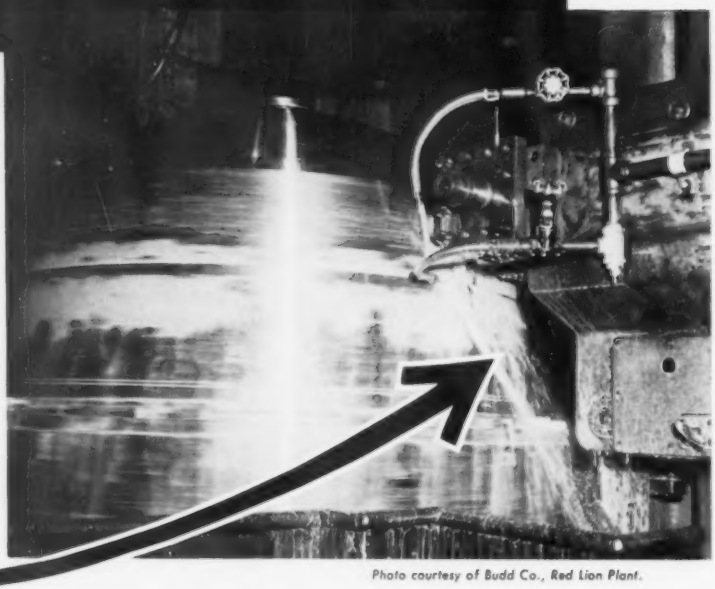


Photo courtesy of Budd Co., Red Lion Plant.

If you are machining René S41 and other special alloys, you will require extreme film strength lubrication. REVERSOL 1133-5X is a high film strength coolant used with water to impart the required lubricity, tool life, cleaning, rustproofing and longest service life for all cutting and grinding operations without staining the metal.

REVERSOL 1133-5X is used in spray mist cooling applications, too, and it can be used straight or as a soluble oil where a variety of metals are being machined. This unusual product is another outstanding result of HARRY MILLER CORP's research and development program for better metalworking coolants.

In this operation, REVERSOL 1133-5X coolant succeeds where all other coolants failed. It keeps the metal from tearing and maintains a finish on the following:

Operation: Machining a section of a pressure vessel

Material: 4340 carbon steel, approx.: 48" dia.

Speed: 97 rpm

Feed: .020

Depth-of-cut: .080 ·

Tool: Carbide

Machine: Giddings & Lewis, Double Head (with side rail) Boring Mill

To achieve a 63 finish: Speed: 100 rpm

Feed: .009, Depth-of-cut: .020.

Write, wire or call for full details on REVERSOL 1133-5X *and other* HAMICO *products for metalworking.*

REVERSOL 1133-5X:

- is reversible—can be used straight or emulsified
- is suitable for both ferrous and non-ferrous metals
- will not discolor non-ferrous metals
- is excellent rust preventive
- wets out metallic silt, prevents floating
- does not smoke or turn rancid
- provides cooler work, highest production, longer tool life

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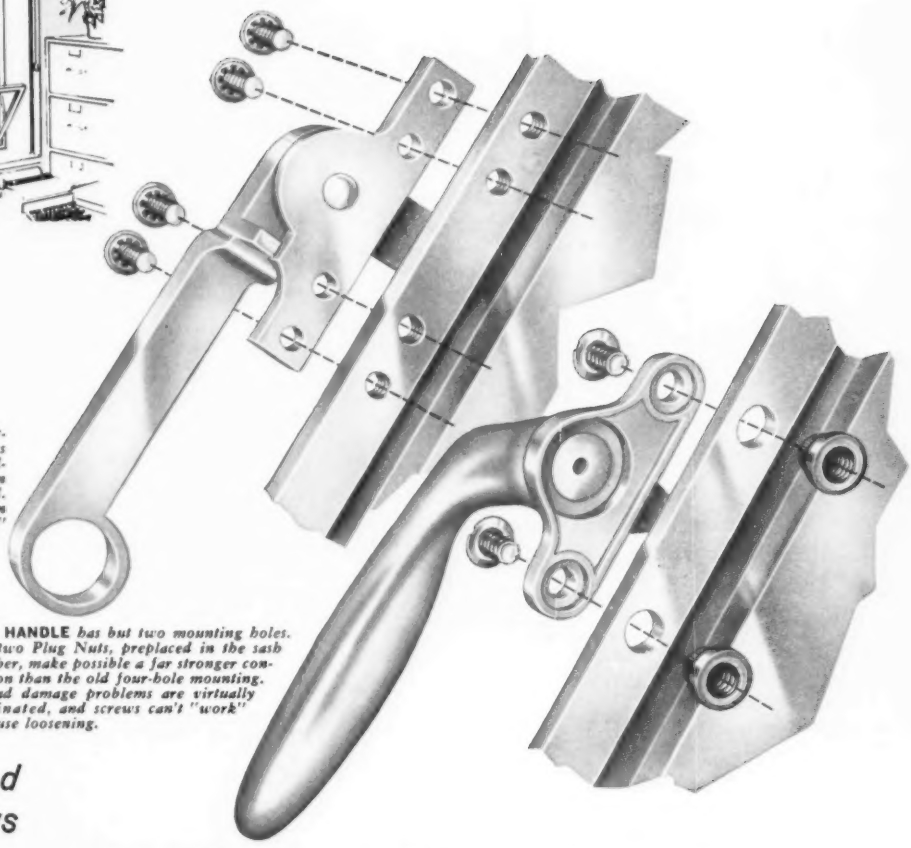
OLD HANDLE *required four mounting holes—and four tapped holes in the sash member. During installation, tapped holes were often damaged and had to be retapped. Handles frequently loosened in service because the screws "worked" in the holes.*



NEW HANDLE *has but two mounting holes. Just two Plug Nuts, preplaced in the sash member, make possible a far stronger connection than the old four-hole mounting. Thread damage problems are virtually eliminated, and screws can't "work" to cause loosening.*

On projected metal windows

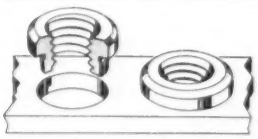
Plug Nuts cut installation costs... permit improved handle design

Using Plug Nuts to fasten window handles, a leading window manufacturer was able to: (1) improve handle design; (2) reduce installation cost; (3) eliminate handle loosening.

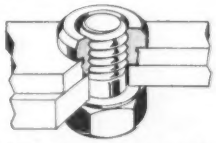
Plug Nuts are hardened, threaded inserts designed to be pressed into ductile material. Once inserted, the Plug Nut becomes a self-clinching, pre-placed nut—improving fastenability of thin or soft materials, such as steel, brass and aluminum. Plug Nuts are ideal for blind or hard-to-reach locations, and do not affect flatness of product material.

Plug Nuts are made for use in any thickness of material down to .030" and in any tap size from #4 to ¾". You can order Plug Nuts in case hardened steel, brass, various grades of stainless and aluminum in a full range of finishes. *Write for samples and complete application data.* Call your Lamson Distributor for immediate service on standard fasteners.

Distributors: Franchises for the sale of Plug Nuts are available in selected territories.



Plug Nut is easily inserted with hand punch or small press. Displaced hole material flows into knurls and annular groove, to clinch nut securely in place. Note that Plug Nut does not project through material.



Plug Nut's low profile head is a real advantage where clearance is tight.

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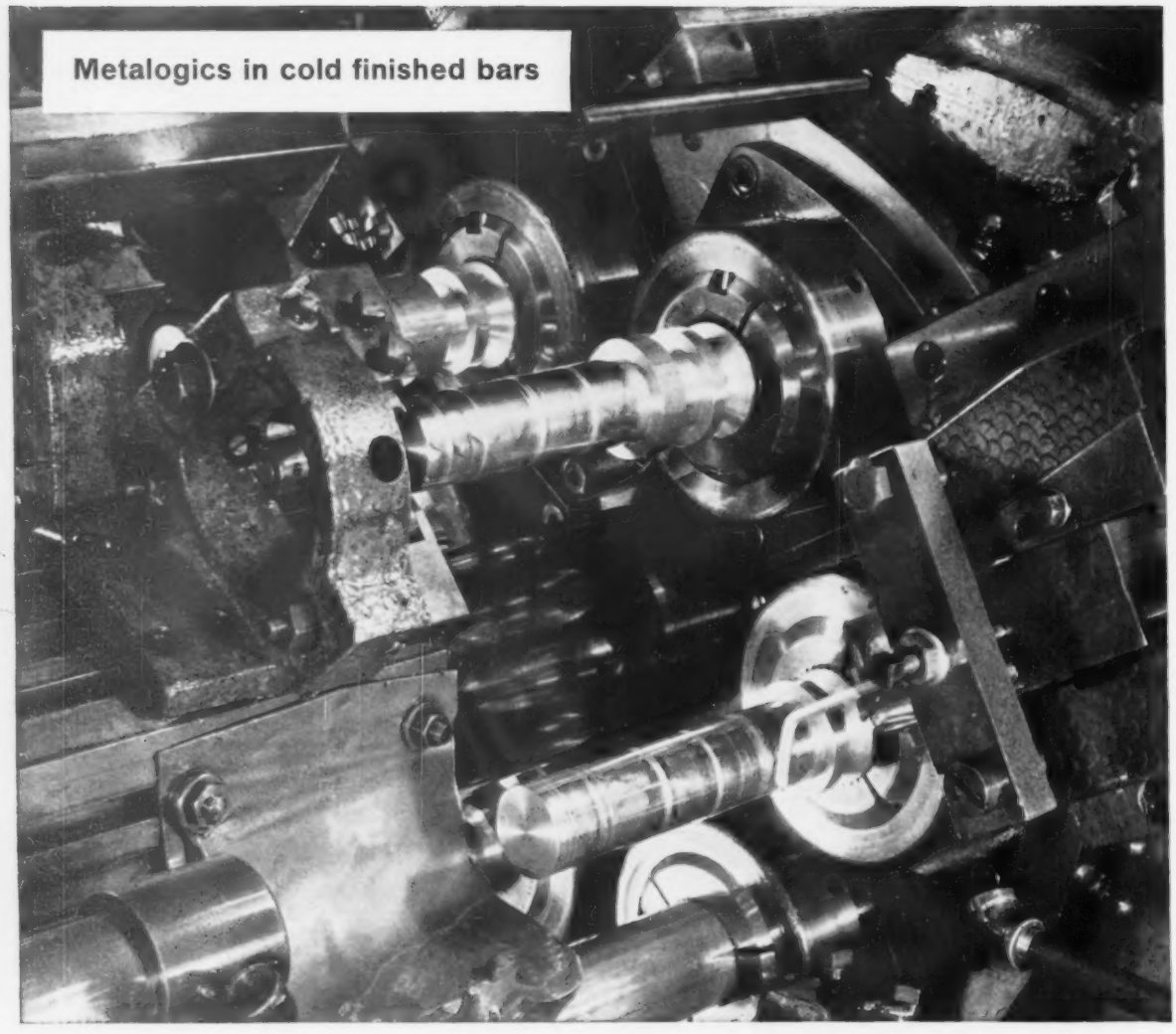
5000 TIEDEMAN ROAD • CLEVELAND 9, OHIO

Plants in Cleveland and Kent, Ohio • Chicago and Birmingham



The big difference in Ryerson cold finished bars—

consistent machinability

When you buy cold finished bars from the nation's largest supplier of steel from stock—Ryerson—you can always count on optimum machinability with dependable consistency. Setup headaches, production snarls and rejects are reduced to a minimum because the rigid quality controls of Ryerson Metalogics assure uniformity of stock from one lot to another.

In addition to this consistency, Metalogics offers you unequaled service in depth. With 118 years of steel service experience, Ryerson has helped solve every conceivable kind of machining problem. And Ryerson stocks are the nation's largest, including even the hardest-to-get types and sizes. So Ryerson specialists are able to recommend the very best steel for any given application.

For consistent optimum results . . . plus on-time delivery, be "Metalogical"—call Ryerson.

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Old-Fashioned Sales Aids: They're Still as Good as Gold

You are going to need a lot of help to make sales this year—and in the years ahead. IBM machines, tape recorders, automated machinery, fancy and efficient communication gadgets and gimmicks are helpful. But you need people to make most of these fabulous things work.

It may seem silly to suggest that old fashioned ideas will make your sales job easier. They will make new friends for you too in this at-times-sterile business world.

Take your switchboard operators. If you have a lemon who gets your party riled up before he gets to you, two things happen: she offsets the good work of the others; then she unconsciously frustrates your potential customer.

Have you ever called someone only to be told that your pal is either in conference, is away, can't be reached or is unavailable. There must be a better way to handle this. Chances are he is right there, he is at a meeting (and would like an excuse to duck it) or the lug hasn't even got to his cell yet.

Once in a great while you run into a president, a vice-president, or a public relations man who answers his own phone. True, this is the exception, but it happens. Maybe you can't do this because you are too busy. But you can make it easier to be reached than probably is now the case. You will note the change in your callers' attitude.

It is a good idea to reward with a kind word those people who help you make a good impression upon your sales prospects. That used to be known as courtesy. It is often so rare these days that as a spontaneous effort it actually floors people.

Of course there are bores. There are salesmen who make a living calling on you. There are perennial gripes who want your ear. There are insurance people who can do you or your family a big favor. There are times when you are too busy and you are pushed for time. Funny though, this applies to everyone in the whole business world.

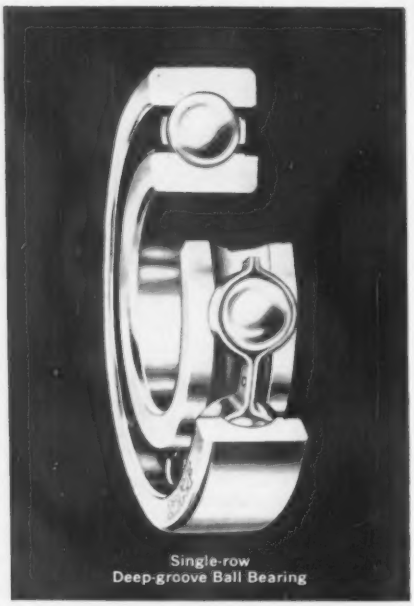
The neat letters—without the fancy verbiage—put your prospect in a good frame of mind. He may not realize this, but it's true. While you are at it you really can be little warmer in your language. It won't hurt.

Old-fashioned? Yes. But you will be surprised how valuable these items can be.

Why not try them again?

Tom Campbell

Editor-in-Chief



Single-row
Deep-groove Ball Bearing

Can a standard bearing offer you "more bearing" for your money?

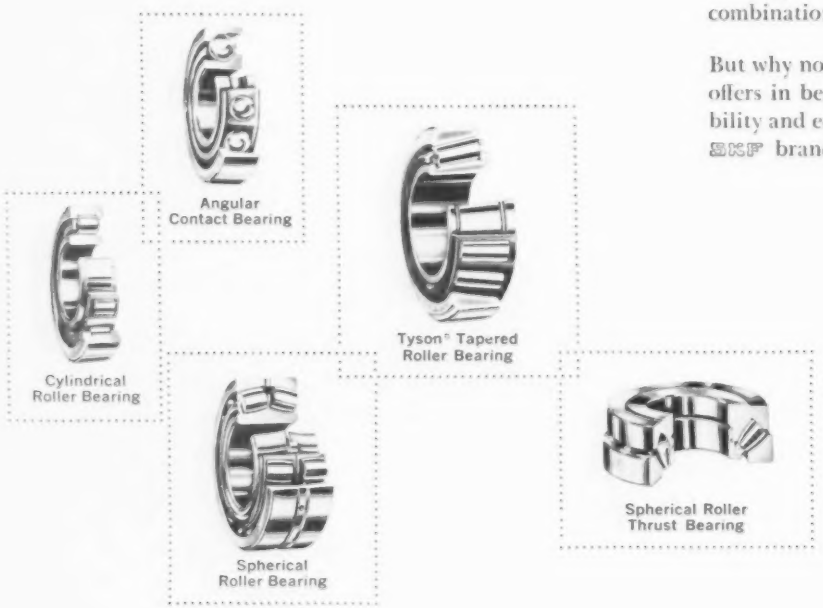
It can if it's made by SKF—because all SKF bearings, both ball and roller, offer special qualities at "production" bearing prices.

Take the single-row deep-groove ball bearing featured here, as an example. SKF designs and builds this type to sustain heavy radial load and thrust load in either direction. Furthermore, it is engineered to run smoothly and quietly at normal speeds with grease lubrication—and at high speeds with oil.

Yet this is a standard SKF ball bearing, mass-produced by automated production equipment at our plant at Altoona, Pa. You can quickly get this bearing in over 100 sizes, ranging from 5/8" to 15.748" O.D., and in a variety of seal, shield and snap-ring combinations.

But why not find out what SKF offers in bearing quality, availability and economy? Just call the SKF branch office nearest you.

6001



Spherical, Cylindrical, Ball, Tyson Tapered and REED Miniature Bearings
EVERY TYPE—EVERY USE
SKF
SKF INDUSTRIES, INC. PHILADELPHIA 32, PA.

Process Recovers Iron Ore

Nearly a billion gallons per year of waste acid solutions, used to pickle steel, can now be reclaimed. Dissolved iron, usually thrown away, can be recovered along with the spent acid. The process wes developed by Ionics, Inc. Dr. Walter Juda, of Ionics, states: "In spite of the probable profit to be made, a break-even cost would be welcome just to eliminate water pollution problems."

Reduce Aluminum Prices?

A new tandem cold mill, now being installed by a leading aluminum producer, could be the key to future market participation for the metal. If the mill performs as well as expected, a sharp reduction in aluminum sheet costs may be possible. This would open up tonnage markets now out of aluminum's reach.

Pre-Assemble Mill Control

First-known completely pre-assembled control for a coiling and welding line will cut installation time at the mill from three weeks to about three to seven days. The electric controller was made for a new coiling line at U. S. Steel's Ohio Works. This line will turn out 30,000-lb coils.

Steel Imports Fall 30 Pct

Foreign steel prices are tumbling in the midwest. One grade has fallen $56 per ton in three weeks, on the basis of offering prices. Despite price slashes, foreign steel brokers report considerable consumer resistance, with business levels off as much as 30 pct from year ago levels.

Design Anti-Missile Ray?

Dr. I. E. Sanger, Technical University, Stuttgart, Germany, proposes photon research for development of an anti-missile searchlight. He says we can consider a realistic possibility—an ultraviolet searchlight exerting a radiation pressure of many tons. The high-energy beam would destroy flying objects at distances up to several hundred miles in a fraction of a second. This could provide our best defense against the ICBM or satellite missiles.

Concrete Cap Speeds Work

Damage to a blast furnace lining was repaired by pouring a concrete cap over the coke burden. Workmen, using the cap as a base for scaffolds, sand blasted the worn lining to produce a clean surface. Then, two hoses delivering 70 psi applied the refractory material to a thickness varying between 20 to 33 in. The entire repair job took only five days.

Self-Sufficient Mills

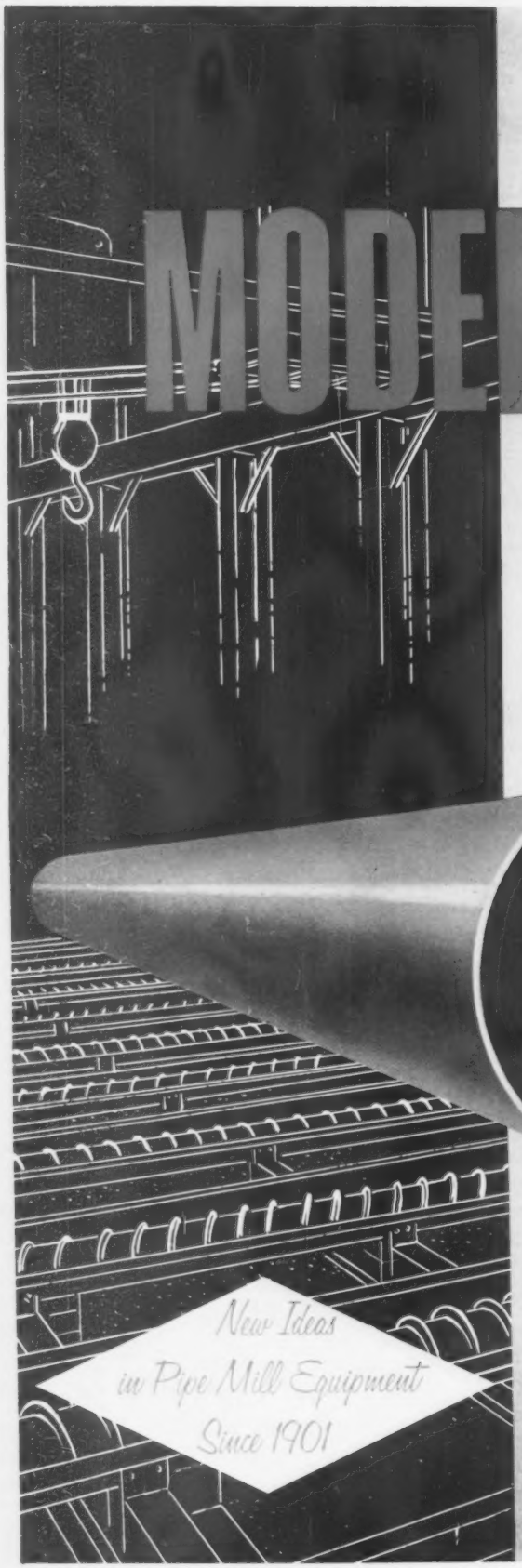
At least two major steel mills have indicated that as of this month they'll be virtually self-sufficient on scrap when operations fall into the 80 pct range. At the same time this quiet announcement was made to scrap suppliers, it was indicated that a third major mill would achieve the same level of hot iron output within six months.

Evaluate Stainless Demand

Look for April to tell the story on future demand for stainless steel. Producers say March should clean up most of the orders based on inventory. April orders should reflect normal demand. With short lead times now in effect, the mills won't know how good this demand is until they're actually into the month.

Produce Colored Aluminum

One major aluminum producer will soon announce a new method of coloring aluminum. Details haven't been announced yet, but it's understood that the color comes from alloying elements —rather than from organic dyes. The new anodic process is reported to protect the colored aluminum.



Pipe mills, too, need MODERNIZING

We are doing a lot of work these days on modernizing Continuous Butt Weld Pipe Mills and Seamless Tube Mills.

The continued and projected demand for pipe and tubes makes modernization of mills a must to maintain a competitive position in the business.

Individual items of the mills can be revamped. Existing mills can be rebuilt. Mills can be moved from one location to another.

As the "pipe mill people", we are constantly developing new ideas for new mills and existing mills. These ideas center on two main points: (1) to increase production and (2) to improve the quality of the pipe or tube.

We would like to talk to you about these new ideas and show you how your mills can be made more profitable. Write to Aetna-Standard Division, Blaw-Knox Company, Pittsburgh 30, Pennsylvania.

Aetna-Standard Division

BLAW-KNOX

LETTERS FROM READERS

Inventions

Sir—Just a few lines to let you know that we have had a response from over 30 states and 3 countries for the free booklet entitled "Inventions Wanted By The Armed Forces" as offered in your Dec. 24 issue of The IRON AGE.

It should also be noted that the requests came from companies and individuals representing what we consider an excellent cross-section of American industry. — E. F. Doidge, Business Analyst, U. S. Dept. of Commerce, Field Services, Phila., Pa.

Business Outlook

Sir — Your editorial, "Business Outlook: Is It Cause For Anxiety?" in the Feb. 25 issue is a sensible, intelligent statement of today's business picture.

I have made copies for my executives who have been bewildered by happenings they didn't expect. Why can't we all have normal minds like you to reason as you do that business doesn't always have to climb; sometimes it can level out and be normal and that is healthful.—E. L. Solomon, Max Solomon Co., Pittsburgh, Pa.

Titanium Scrap

Sir—We have read with interest the item on reprocessing titanium scrap which appeared in the Jan. 21 issue on the Newsfront page.

Reference is made to a report for the U. S. Army on metallurgical evaluation of the reprocessed castings. Can you identify the originator of the report so that we might obtain a copy for examination?—Elizabeth Barrett, Librarian, Thompson Ramo Wooldridge Inc., Cleveland, Ohio.

Write to the Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C.—Ed.

More Information

Sir—We are interested in obtaining some literature on the Shalco Corporation shown on page 59 of the February 4 issue of The IRON AGE.

Will you please advise where to write for such information, or forward our request to the proper party. We shall greatly appreciate your cooperation.—J. R. Seyferth, President, West Michigan Steel Foundry Co., Muskegon, Mich.

Write to Shalco Div., National Acme Co., E. 131 and Coit Rd., Cleveland 8, Ohio.—Ed.

Profitable Reading

Sir—I followed your articles on the steel strike with great interest and would appreciate receiving a copy of the booklet "Who Won in the Steel Contract?"

Incidentally, the first page I turn to in your magazine is the editorial page. Tom Campbell's editorials are very good. It is too bad our government leaders don't read and profit by them.—O. G. DeLap, The Parker Pen Co., Janesville, Wis.

A copy is on the way.—Ed.

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Complete financing for Lease-Purchase of a new plant is available in labor-surplus areas of Pennsylvania through combined efforts of lending institutions, non-profit community organizations and the Pennsylvania Industrial Development Authority. Interest as low as 2%, with deferred amortization, can be applied on up to one-half of total plant cost.

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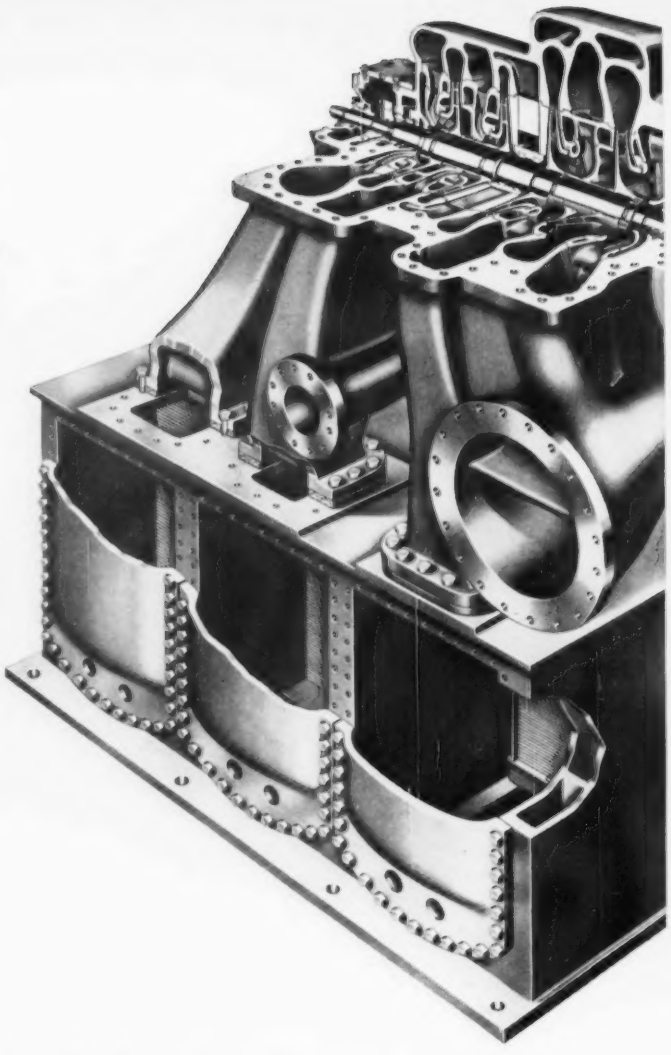
For OXYGEN PLANTS and other INDUSTRIAL AIR applications ...this new CLARK Centrifugal Compressor



High purity air is vitally important for the steel industry's new tonnage oxygen plants. While existing compressors could readily handle the service, economic considerations indicated the need for special high performance design.

The result is the new Clark Unatherm Centrifugal Air Compressor, a single case, four stage design possessing an unusually high hydraulic efficiency. To hold horsepower at a low level, the air stream is intercooled between each stage in base-mounted intercoolers. By mounting the compressors over the intercoolers, important savings in space requirements are realized. In addition to inherent compactness, the Clark design requires access to only one side for maintenance. The remaining three sides may be set flush against walls if required.

Another feature of the new Clark Unatherm Compressor is the use of back-to-back impellers to balance out thrust load. Integral bearing construction and single case design limit bearing and shaft sealing requirements to one at each end of the rotor and also eliminate alignment problems.

Being a simple rotative machine, normal maintenance consists of an occasional inspection. If ever necessary, however, the upper half of the case can be removed without disturbing bearings or breaking pipe connections.

In addition to providing primary air for oxygen plants, the Clark Unatherm Compressor is also an excellent choice for other industrial air uses requiring 110 psig air in capacities ranging from 5,000–38,000 cfm. They are ideal first stage compressors for wind tunnels or soot blowing because of their efficiency and air purity characteristics. The same advantages apply to base load, general industrial air applications where the complete absence of pulsation plus unusual compactness are also highly important features.

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COMPRESSORS
ENGINES • GAS TURBINES

Monkey Shines

If Chatter, the TV star of the chimpanzee circuit, ever gets back to the jungle he'll have some boasting to do. For three days he was sales manager of Interstate Steel Co.

And during his tenure of office he was almost constantly at work pleasing customers. His office was the Interstate booth at the Purchasing Agents Convention in Chicago last month.

MONKEY TALK: Chatter takes over as sales manager.

Sy Lawrence, Interstate sales manager most of the time, says Chatter was aping him all through the convention. But he admits that Chatter's presence was a tremendous attention getter for the booth.

The Art World

For centuries, metals have been used to enhance works of art. And today metals are still playing a big part as materials for the work of sculptors and other artists.

Next month an exhibition will be opened at Cold Spring Harbor, N. Y., featuring the work of J. Anthony Buzzelli. Mr. Buzzelli's work consists of mineral elements fused by heat onto metal surfaces. They range from two and three-in. ash trays to 10-ft long panels designed to beautify building walls.

The work to be displayed is the result of more than 20 years of study and experiment by Mr. Buzzelli.

Reynolds Award—Sculptor William Zorach, of New York, has been commissioned to design the sculpture symbolizing the 1960 R. S. Reynolds Memorial Award.

The sculpture will be presented to the architect selected by an American Institute of Architects jury to receive the $25,000 annual award for making the most significant contribution to the use of aluminum in the building field.

Mr. Zorach's new work will be done in clay for casting into aluminum. He is the fourth sculptor to be commissioned by Reynolds to execute the work of art in aluminum since the award was first presented in 1957.

Ancient Art—And at the Massachusetts Institute of Technology a new method of art casting with metal has been devised.

Using a block of polystyrene plastic, Alfred M. Duca, professional artist and research associate in the Department of Metallurgy at MIT, carved a mold of Pegasus, the winged horse. The actual carving took six weeks with a grapefruit knife.

Into the mold was poured a crucible of molten bronze. And in 38 seconds the airy plastic was replaced with a 400-lb sculpture.

When completed, the process was heralded as the first real innovation to the ancient craft of metal molding in 5000 years.

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for all industrial furnace requirements

Harbison-Walker has more than two-score different castable refractories, plastic fire brick and ramming mixes of conventional classes and various modifications especially adapted for new specific uses. In composition they span all the usual refractory oxides, stabilized natural and synthetic minerals, from the most definitely acid to the most strongly basic. These chemical properties, together with the physical characteristics in the combinations best suited for severe operating conditions provide the refractories for maximum economy.

In accordance with the best practice for the particular purpose, Harbison-Walker monolith-forming refractories are installed by various methods—such as pouring or tamping, troweling or gun-placement—depending upon the product and its application. For many purposes, they are used for complete linings free of joints, for maintenance in making both small and very large patches. Special shapes for emergency or prompt needs can be fabricated for immediate use.

Gunning H-W castables saves maintenance time and increases furnace availability.

Casting H-W Extra Strength Castable in this flue arch cut construction costs 25% and gained 4 days' production time.

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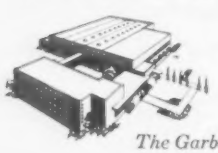

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HW 60-4 B

COMING EXHIBITS

Corrosion Show — March 14-18, Memorial Auditorium, Dallas, (National Assn. of Corrosion Engineers, 1061 M & M Bldg., Houston)

Tool Show—April 21-28, Detroit Artillery Armory, Detroit. (American Society of Tool Engineers, 10700 Puritan, Detroit 38.)

Welding Show—April 25-29, Great Western Exhibit Center, Los Angeles. (American Welding Society, Inc., 33 West 39th St., New York 18.)

1960 Castings Congress & Exposition—May 9-13, Convention Hall, Philadelphia. (American Foundrymen's Society, Golf & Wolf Rds., Des Plaines, Ill.)

Southwestern Metal Show — May 9-13, State Fair Park, Automobile Bldg., Dallas, Texas. (American Society for Metals, Metals Park, Novelty, O.)

Design Engineering Show — May 23-26, Coliseum, New York. (Clapp & Poliak, Inc., 341 Madison Ave., New York 17.)

Production Engineering Show—Sept. 6-16, Navy Pier, Chicago. (Clapp & Poliak, Inc., 341 Madison Ave., New York 17.)

Machine Tool Exposition—Sept. 6-16, International Amphitheatre, Chicago. (National Machine Tool Builders Assn., 2139 Wisconsin Ave., Washington 7, D. C.)

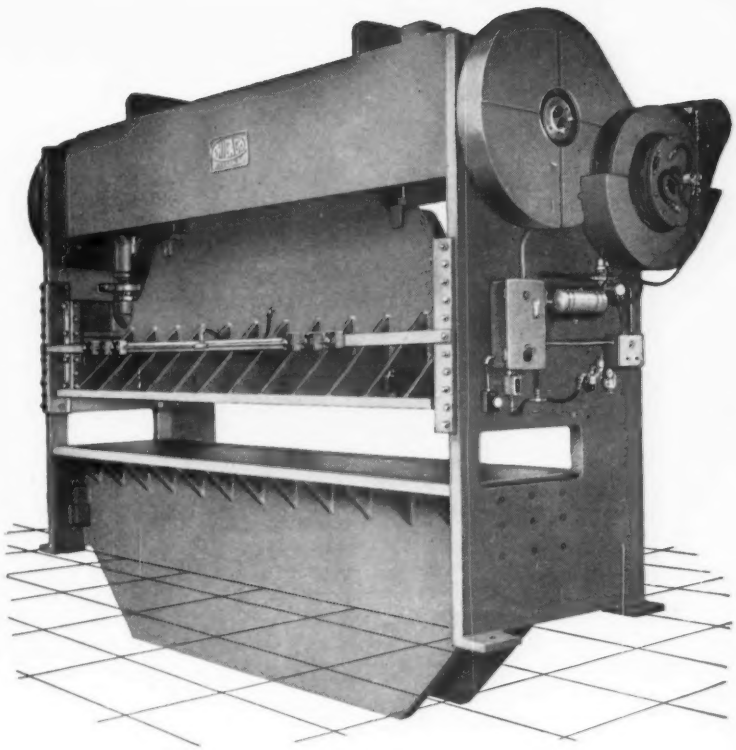
Iron & Steel Show—Sept. 27-30, Cleveland Public Auditorium, Cleveland, O. (Association of Iron & Steel Engineers, 1010 Empire Bldg., Pittsburgh 22.)

MEETINGS

MARCH

National Assn. of Waste Material Dealers, Inc.—Annual convention, March 12 - 15, Waldorf - Astoria Hotel, New York. Association

(Continued on P. 16)



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MEETINGS

(Continued from P. 15)

headquarters, 271 Madison Ave., New York 16, N. Y.

Fire Equipment Mfrs. Assn.—Annual meeting, March 15-16, Barbizon-Plaza Hotel, New York. Association headquarters, 759 One Gateway Center, Pittsburgh.

Society for Non-Destructive Testing—Third international conference, March 15-21, Tokyo, Japan. Society headquarters, 1109 Hinman St., Evanston, Ill.

Electronic Industries Assn.—Spring conference, March 16-18, Statler Hilton Hotel, Washington. Association headquarters, 1721 DeSales St., N. W., Washington.

Scale Mfrs. Assn., Inc. — Spring meeting, March 22-23, Washington. Association headquarters, One Thomas Circle, Washington.

Pressed Metal Institute — Spring technical meeting, March 23-25, The Pick-Carter Hotel, Cleveland. Institute headquarters, 3673 Lee Rd., Cleveland.

Scientific Apparatus Makers Assn.—Annual meeting, March 27-31, Boca Raton Hotel & Club, Boca Raton, Fla. Association headquarters, 20 N. Wacker Dr., Chicago.

Assn. of Lift Truck & Portable Elevator Mfrs. — Spring membership meeting, March 28, Pittsburgh-Hilton, Pittsburgh. Association headquarters, One Gateway Center, Pittsburgh.

The Material Handling Institute, Inc.—Spring meeting, March 28-29, Pittsburgh-Hilton, Pittsburgh. Institute headquarters, One Gateway Center, Pittsburgh.

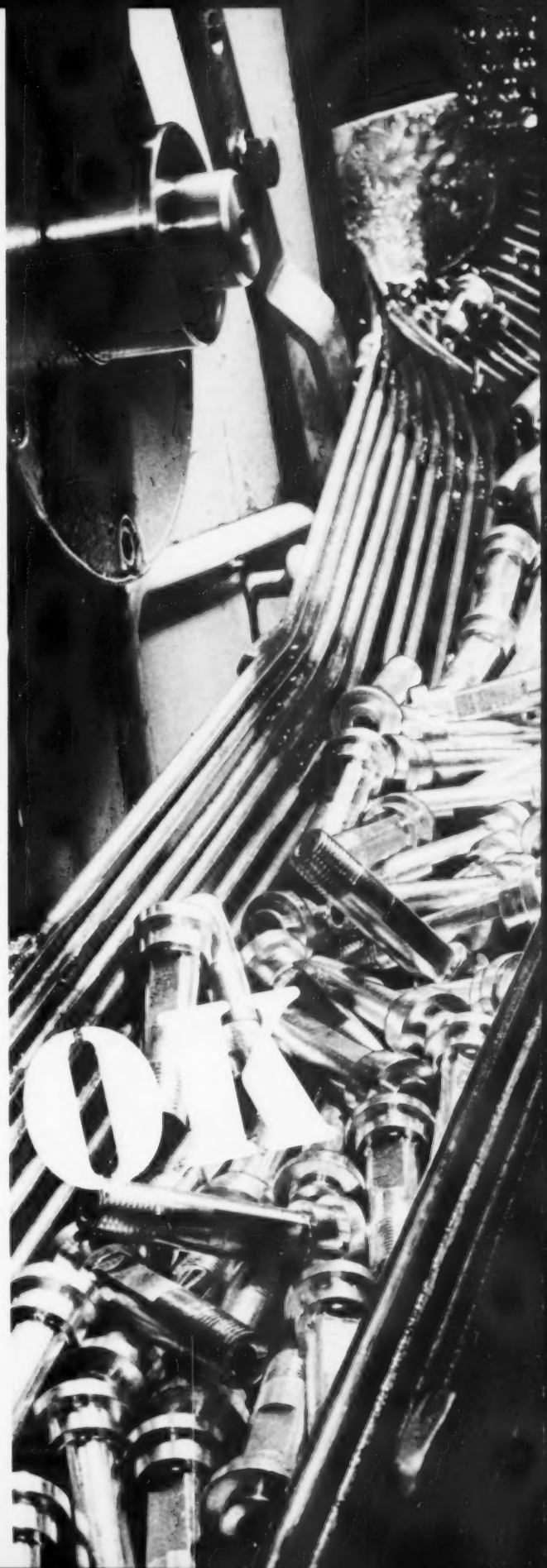
The Industrial Truck Assn.—Spring meeting, March 28-30, Pittsburgh-Hilton, Pittsburgh. Association headquarters, One Gateway Center, Pittsburgh.

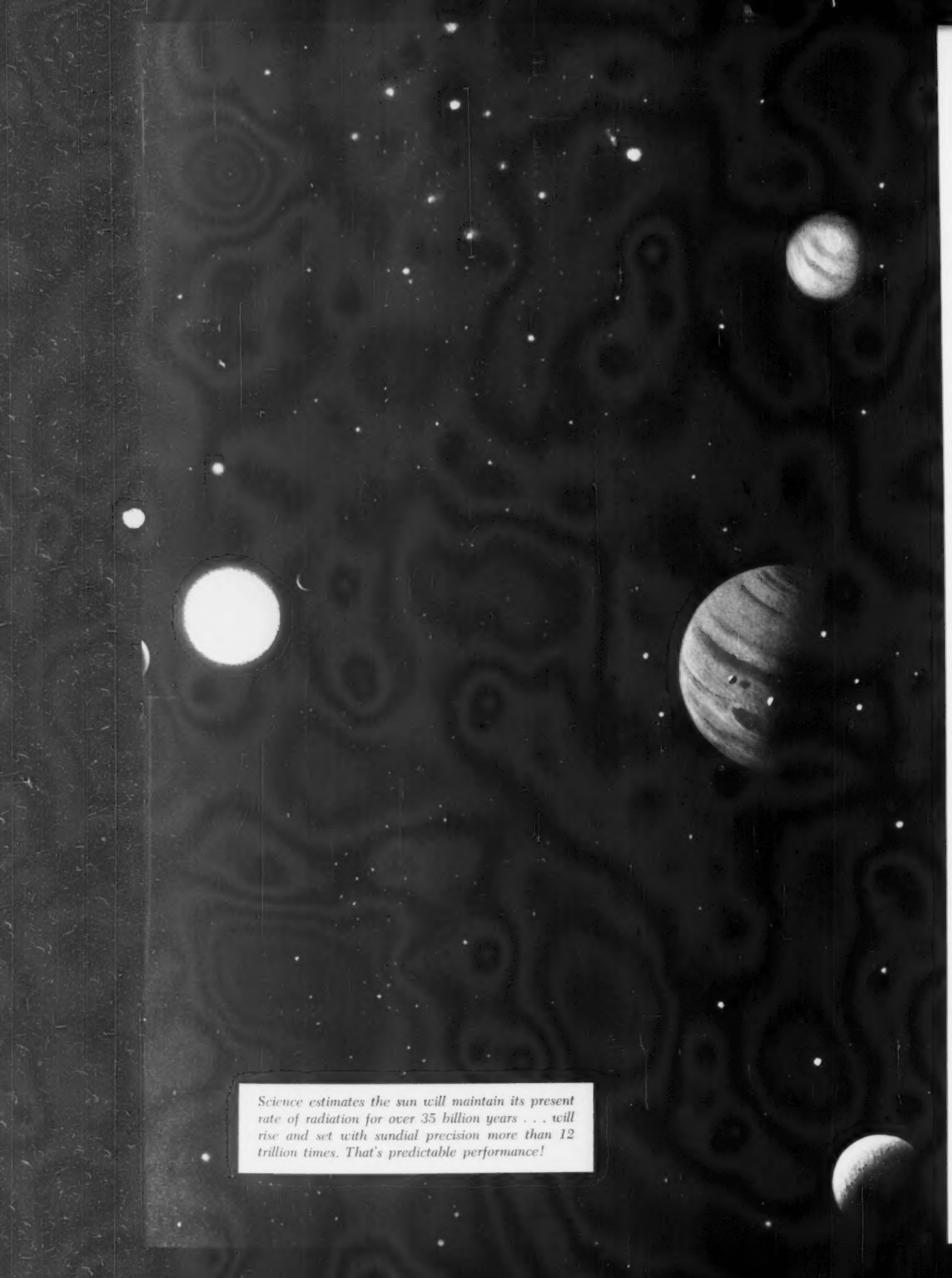
you have faith that the sun will rise tomorrow...

...don't you wish
you had that much faith
in the performance of the

specialty steels

you use?





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The Carpenter Steel Company, Reading, Pa.

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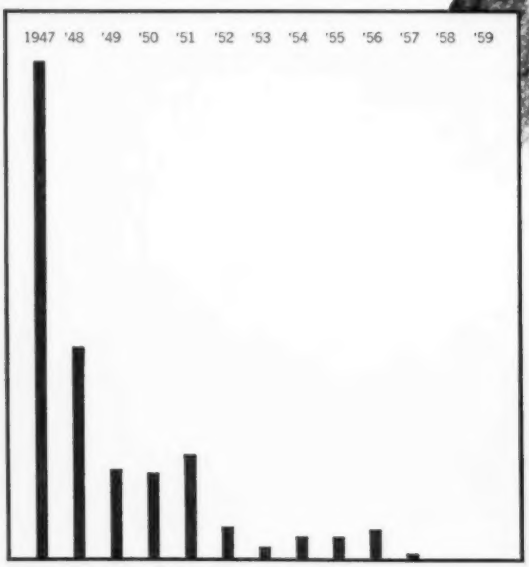
*Under Wisconsin Law minimum benefits paid to any employee for loss of vision in one eye is $9,250.



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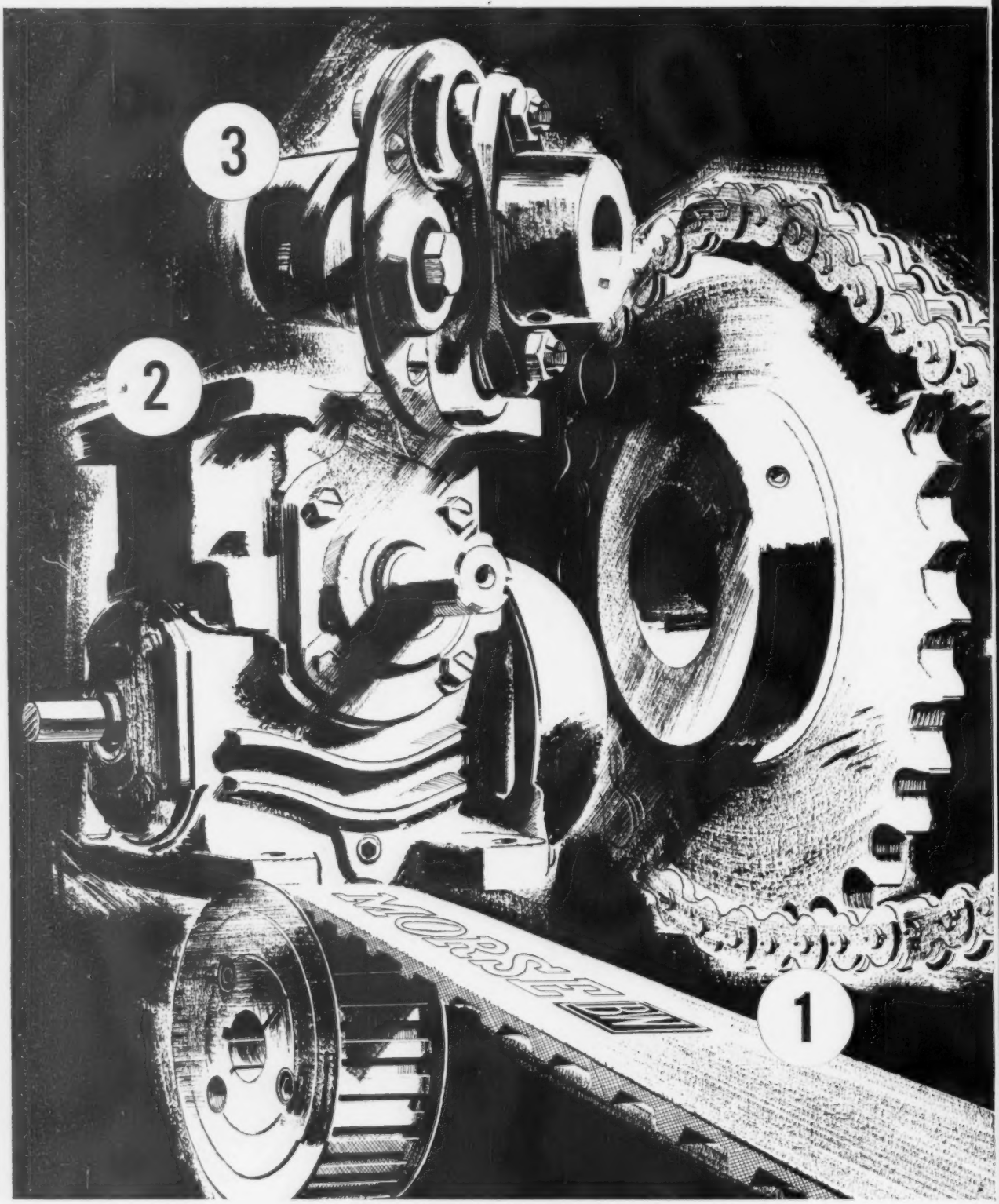

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Whitehead Metals, Inc. (Bedford 3100)
New York (Long Island City 1)
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Henry B. Lust, Inc. (Circle 6-1748)
New York 13
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New York (Brooklyn)
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Syracuse 4
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Dayton
Ohio Metal & Manufacturing Co. (Clearwater 3-4192)
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OKLAHOMA
Tulsa 13
Metal Goods Corp. (Temple 6-2561)
OREGON
Portland 9
*Pacific Metal Co. (Capitol 7-0693)
PENNSYLVANIA
Philadelphia 34
*Edgcomb Steel Co. (Garfield 3-6300)
Philadelphia
Metal Supply Co. (Center 6-0220)
Philadelphia 40
Whitehead Metals, Inc. (Baldwin 9-2323)
Pittsburgh 33
*Williams and Company, Inc. (Cedar 1-8600)
York
Edgcomb Steel Co. (47-1411)
RHODE ISLAND
Slatersville
Edgcomb Steel of New England, Inc. (Poplar 7-0900)
SOUTH CAROLINA
Greenville
The J. M. Tull Metal & Supply Co., Inc. (Cedar 3-8366)
TENNESSEE
Memphis 6
Metal Goods Corp. (Whitehall 8-3407)
TEXAS
Dallas 9
Metal Goods Corp. (Fleetwood 1-3271)
Houston 3
Metal Goods Corp. (Republic 3-5441)
UTAH
Salt Lake City 1
Pacific Metals Co., Ltd. (Davis 2-3461)
WASHINGTON
Seattle
Ducommun Metals & Supply Co. (Parkway 5-1500)
Seattle 4
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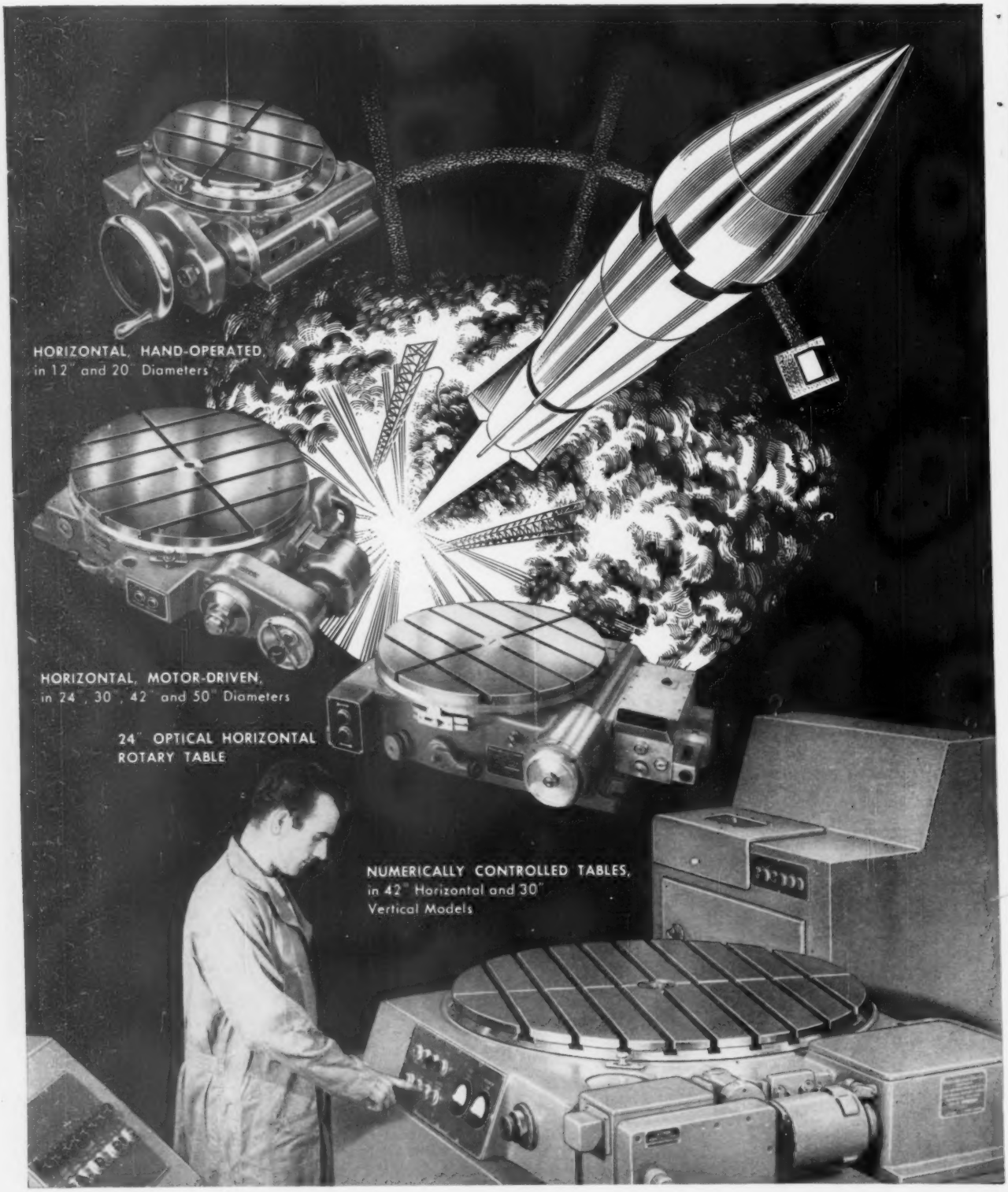
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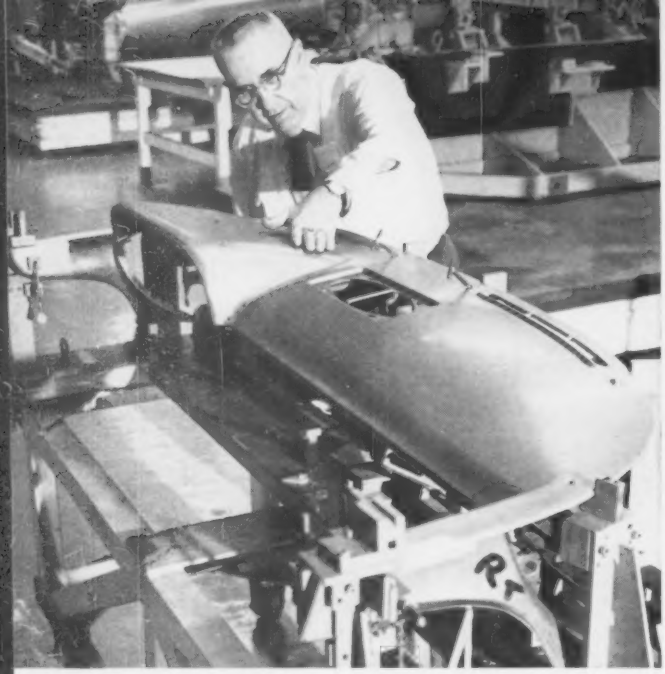


Pattern Sheet—In the plant of one of the world's largest auto makers, Pittsburgh Steel Co.'s Pattern Sheet was used to make instrument panels. Pattern Sheet is cold rolled sheet steel with a design rolled right into the steel.

Sheet Steel—International Harvester specified cold rolled sheet steel from Pittsburgh Steel Co. for many components of the bodies it makes for light trucks. International Harvester demands fine surface, good weldability and formability.

When Steel From Pittsburgh Means "Pittsburgh Steel"

Pittsburgh Steel Co. Provides Blue Chip Companies With Wire, Sheet and Tubes For Everything From Missiles to Hairpins

Performance is the payoff. Go into any manufacturing plant where steel sheet, wire or tubing is pressed, stamped, cut, welded or otherwise formed into finished products. You'll find steel users concerned about how the steel they buy performs on their equipment.

Steel is made to industry-wide standards but there are areas where one producer's steel performs a little better. Perhaps one mill's sheet holds to the exact thickness desired more consistently. Or maybe it consistently does better on tensile strength.

Pittsburgh Steel has an excellent record in making sheet, strip, wire and tubing which performs better for fabricators.

Photographs on these pages take you into some fabricating plants and to field applications where specifications for steel are precise because users demand good performance. Pittsburgh Steel makes good by meeting these demands.

Take International Harvester Company. Using cold rolled sheet from Pittsburgh Steel Co., International Harvester combines good styling with ruggedness in light truck bodies.

• **Switched to Pittsburgh Steel**—One of the oldest and largest ball bearing makers now uses mechanical tubing from Pittsburgh Steel to make a difficult bearing part. Formerly, alloy bars were used for this high speed machining operation. The company switched to Pittsburgh Steel tubing because it provided more pieces per day, longer tool life, less machining and a lower cost material.

See that oil field "roughneck" up on the monkey board of an oil well rig? He's working on a rig drilling for oil in the middle of a grapefruit grove near McAllen, Tex. On that job Chief Engineer M. D. Frazier of Texkan Oil Co., said: "If you don't have good pipe you have no well. We've never run into defects with Pittsburgh Steel's seamless tubing."

The little springs in the photograph at right have a tough job. Each of these carburetor pump springs will keep a motorist moving although he may never know of their busy life under the hood of his car. Made of music wire only .014 inch thick these springs are made from wire drawn by Pittsburgh Steel's subsidiary, Johnson Steel & Wire Co. Performance of the steel is tops.

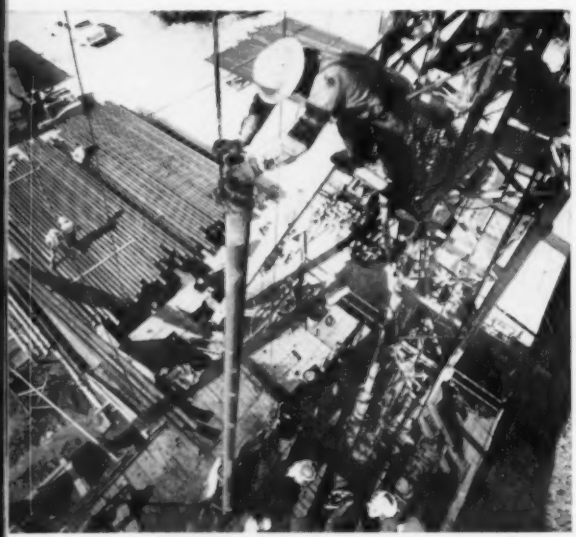
Or take those seat cushions for a compact car. Stubnitz Greene Corp. uses Pittsburgh Steel wire to coil this new kind of seat spring, Torflex Spring, because the steel performs well on coiling machines.

A new product, one of many in the making, was developed in 1959. It is Fab-Form, a permanent steel form for concrete floor and roof slabs, which speeds work and lowers costs. Longer and wider than its competitors, it is supplied to users with a new welding technique which speeds installation.

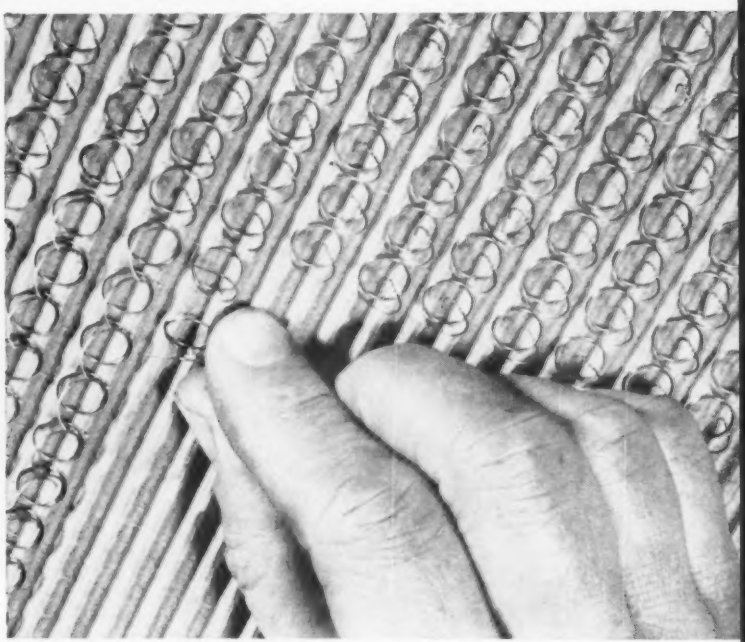
All this is typical of the company's quiet determination to improve facilities, widen markets and diversify products so that customers, employees and stockholders all may benefit.

Manufacturers Wire—Used here to make a new type spring used in the seat and back cushions of a compact car, Pittsburgh Steel Co.'s manufacturers wire is consistently dependable.

Seamless Mechanical Tubing—Not a new weapon but mechanical tubing from Pittsburgh Steel being processed into a bearing part. This manufacturer switched from alloy bars to Pittsburgh tubing and reduced production costs.



Seamless Oil Country Goods—That's what they call drill pipe, casing and oil well tubing in the oil fields. Here Pittsburgh Steel casing is being run into a 7,500-foot deep well in Texas.



Fine Wire Specialties—Wispy but precise as the pattern they make on the gummed pallet are carburetor pump springs coiled from music wire made by the subsidiary Johnson Steel & Wire Co.

Construction Products—A new Pittsburgh Steel product—Fab-Form—goes down on joists preparatory to pouring a concrete slab. Fab-Form is a permanent steel form for concrete roof or floor slabs.

Pittsburgh Steel Company

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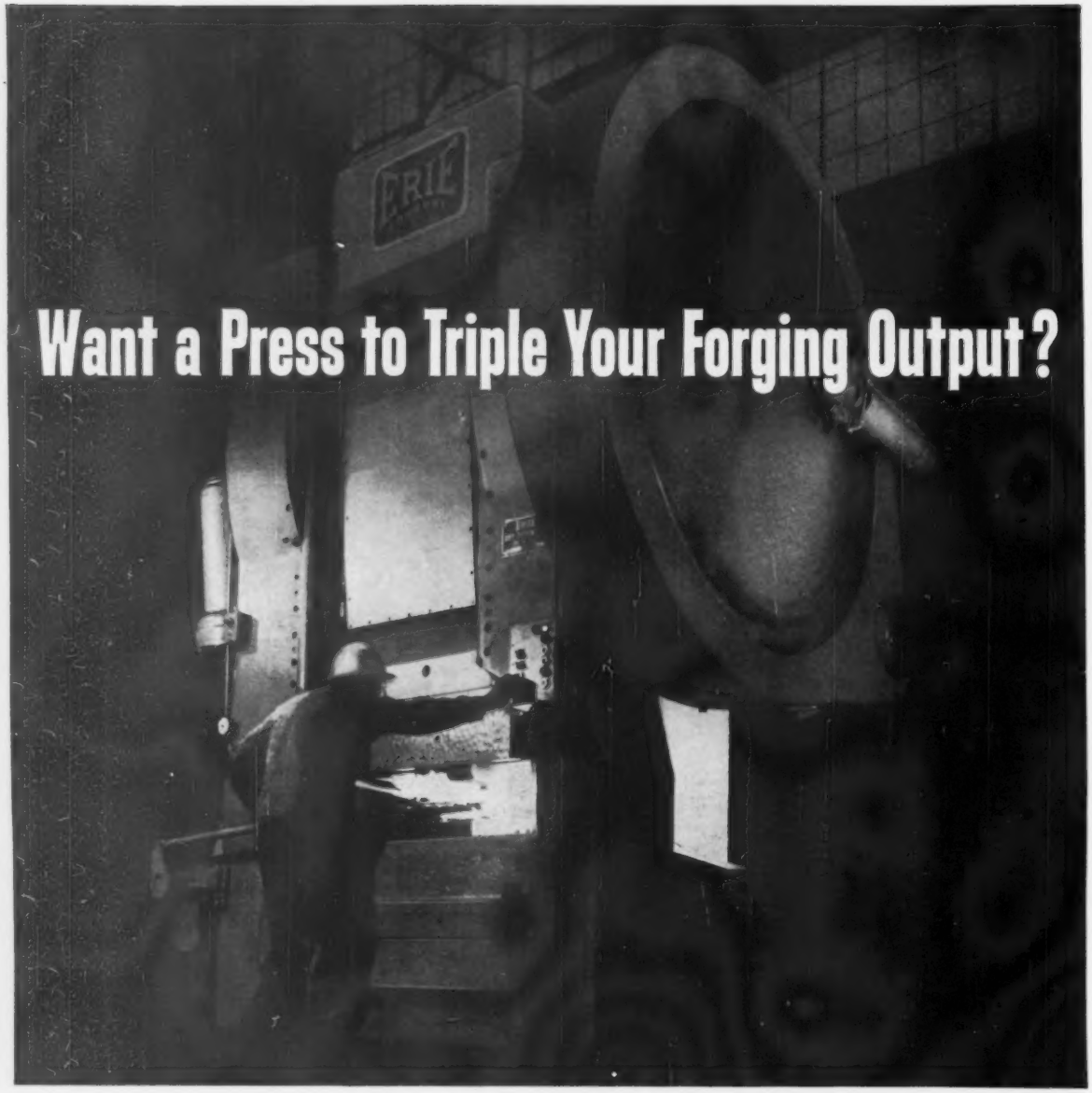

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We would like to discuss application of automated presses to your production requirements. For the complete story, phone or write Mr. R. E. Sanford, Erie Foundry Company, Erie 1, Pa.

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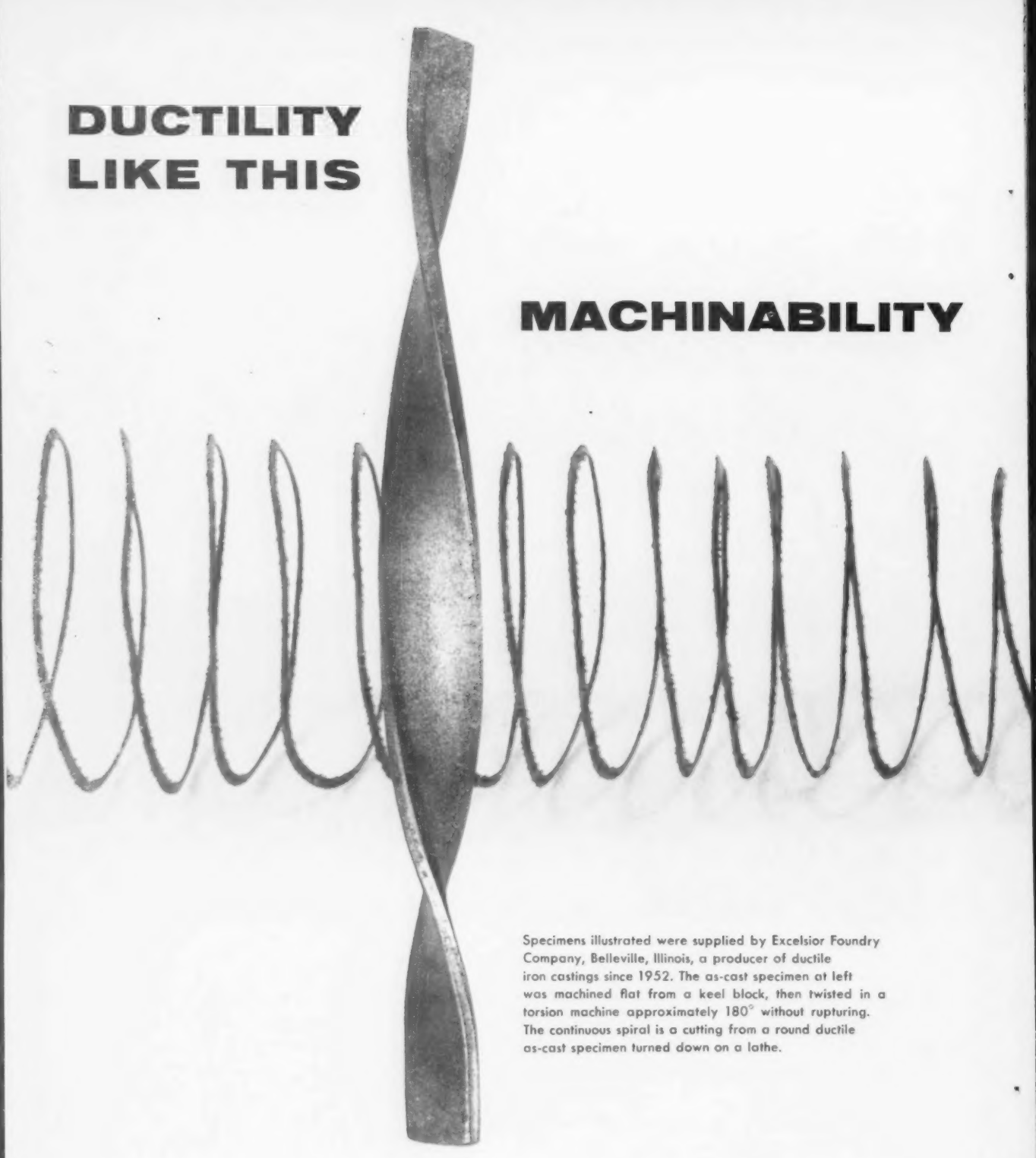

Specimens illustrated were supplied by Excelsior Foundry Company, Belleville, Illinois, a producer of ductile iron castings since 1952. The as-cast specimen at left was machined flat from a keel block, then twisted in a torsion machine approximately 180° without rupturing. The continuous spiral is a cutting from a round ductile as-cast specimen turned down on a lathe.

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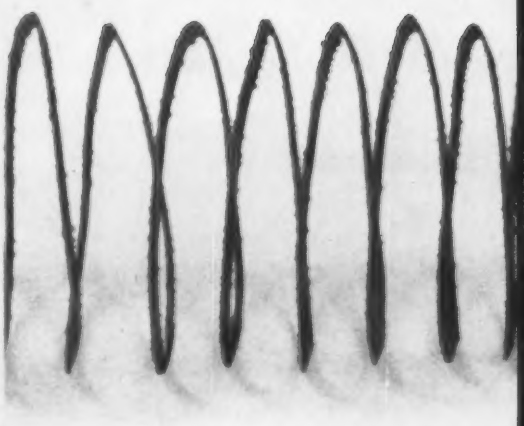

The finest spheroidal graphite or ductile types of cast iron possess many of the engineering advantages of steel—ductility, high strength, toughness, machinability, heat- and wear-resistance—when they are produced with Chateaugay Pig Iron.

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Chateaugay's consistently uniform chemical analysis is an important factor in achieving as-cast properties, especially ductility. Freedom from excessive amounts of subversive elements assures the formation of graphite nodules. Additionally, the inherently excellent properties of Chateaugay Pig Iron are maintained in the ductile form.

Castings produced with Chateaugay are of consistently high quality with close grain and uniform structure. And, because it can be cast without excessive shrinkage, adjoining light and heavy sections are filled completely. This assures strong, flaw-free castings accurate to patterns and shapes.

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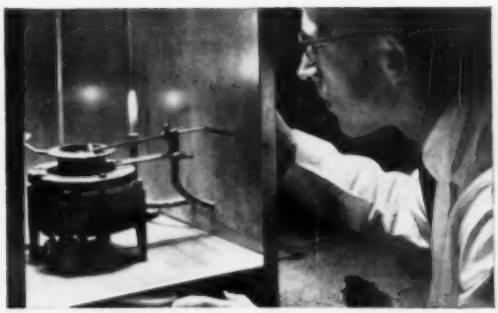

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BIRMINGHAM—F. H. Ross & Company, Inc. **(C M)**
MOBILE—McKesson & Robbins, Inc. **(C M P T)**
MOBILE—F. H. Ross & Company, Inc. **(C M)**
MONTGOMERY—Wittichen Chemical Company **(C M P)**

ARIZONA
PHOENIX—Braun Chemical Company **(C M P T)**
PHOENIX—Western Chemical Company **(C M P)**
TUCSON—Western Chemical Company **(C M P)**

CALIFORNIA
LOS ANGELES—Braun Chemical Company **(C M P T)**
LOS ANGELES—McKesson, Mefford Chemical Division **(P)**
LOS ANGELES—Pemaco, Inc. **(P T)**
SAN DIEGO—Braun Chemical Company **(C M P T)**
SAN FRANCISCO—Braun-Knecht-Heimann Co. **(C M P T)**
SAN FRANCISCO—G. N. Meacham Company **(C)**

COLORADO
DENVER—Braun-Knecht-Heimann Company **(C M)**
DENVER—Chemical Sales Company **(C M P T)**
DENVER—McKesson & Robbins, Inc. **(C M P T)**
DENVER—Mine and Smelter Supply Company **(C M P T)**
GRAND JUNCTION—C. D. Smith Co., Chemical Div. **(C P T)**

CONNECTICUT
HARTFORD—Dwight R. Judson Company **(C T)**
NEW HAVEN—H. Krevit and Company, Inc. **(C P T)**
SHELTON—Axton-Cross Company **(C M P T)**
SOUTH NORWALK—McKesson & Robbins, Inc. **(C M P)**
SOUTH NORWALK—Guard-All Chemical Co. **(C M P T)**
WATERBURY—Hubbard Hall Chemical Company **(M)**

FLORIDA
JACKSONVILLE—F. H. Ross & Company, Inc. **(C M)**
JACKSONVILLE—Amica Burnett Chemical Co. **(C M P T)**
MIAMI—Amica Burnett Chemical Co. **(C M P T)**
MIAMI—Biscayne Chemical Laboratories **(C M P T)**
ORLANDO—Atlantic Chemicals, Inc. **(C M P T)**
TAMPA—Atlantic Chemicals, Inc. **(C M P T)**
TAMPA—McKesson & Robbins, Inc. **(C M P T)**

GEORGIA
ATLANTA—Chapman Chemical Company **(T)**
ATLANTA—McKesson & Robbins, Inc. **(C M P T)**
ATLANTA—F. H. Ross & Company, Inc. **(C M)**
ATLANTA—Southern States Chemical Co. **(C M P T)**
BIRMINGHAM—Chapman Chemical Company **(T)**
COLUMBUS—F. H. Ross & Company, Inc. **(C M)**
DUBLIN—Textile Aniline Chemical Company **(T)**

IDAHO
BOISE—Van Waters & Rogers, Inc. **(C M P)**

ILLINOIS
AURORA—River Valley Chemicals, Inc. **(C M P T)**
CHICAGO—Central Solvents & Chemicals Co. **(C M P)**
CHICAGO—C. P. Hall Company of Illinois **(C M P T)**
CHICAGO—McKesson & Robbins, Inc. **(C M P T)**
CHICAGO—Joseph Turner & Company **(C M P T)**
DECATUR—McKesson & Robbins, Inc. **(C M P T)**
EFFINGHAM—Wabash Independent Oil Company **(C P T)**
MELROSE PARK—London Chemical Company, Inc. **(P T)**
PEORIA—McKesson & Robbins, Inc. **(C M P T)**
ROCKFORD—Industrial Oil & Chemical Company **(C)**
ROCKFORD—Viking Chemical Company **(C M P T)**

INDIANA
EVANSVILLE—Barning Industrial Chemicals, Inc. **(C M P T)**
EVANSVILLE—Charles Leich and Company **(P)**
FT. WAYNE—Hoosier Solvents & Chemicals Corp. **(C M P)**
FT. WAYNE—Inland Chemical Corporation **(C M P)**
HAMMOND—Inland Chemical Corporation **(C M P T)**
INDIANAPOLIS—Hoosier Solvents & Chemicals Corp. **(C M P)**
INDIANAPOLIS—Wm. Lynn Chemical Co., Inc. **(C M P)**
INDIANAPOLIS—Ulrich Chemical Company, Inc. **(C T)**
KOKOMO—Plating Products, Inc. **(T)**
LOGANSPORT—Plating Products, Inc. **(T)**
SOUTH BEND—Inland Chemical Corporation **(C M P T)**
SOUTH BEND—Stevens Company **(C M P)**

IOWA
BETTENDORF—Barton Naphtha Corporation **(C M P)**
BURLINGTON—McKesson & Robbins, Inc. **(C M P T)**
CEDAR RAPIDS—McKesson & Robbins, Inc. **(C M P T)**
COUNCIL BLUFFS—Barton Solvents Co. **(C M P T)**
DAVENPORT—McKesson & Robbins, Inc. **(C M P T)**
DES MOINES—Barton Naphtha Company **(C M P T)**
SUMNER—Overton Chemical Sales **(C)**

KANSAS
WICHITA—McKesson & Robbins, Inc. **(C M)**
WICHITA—Reid Supply Company **(C P T)**

KENTUCKY
LOUISVILLE—Dixie Solvents and Chemicals Co. **(C M P)**
LOUISVILLE—Gans Chemical and Supply Company **(P)**
LOUISVILLE—McKesson & Robbins, Inc. **(C M P T)**

LOUISIANA
BATON ROUGE—McKesson & Robbins, Inc. **(C)**
NEW ORLEANS—McKesson & Robbins, Inc. **(C)**
NEW ORLEANS—Southern Solvents and Chemicals **(C M P T)**

MAINE
LEWISTON—Polar Chemical Company **(C M P T)**

MARYLAND
BALTIMORE—B. J. Howard Company **(C M P T)**
BALTIMORE—Leidy Chemicals Corporation **(C M P)**
BALTIMORE—Seiler-Hughes Chemicals, Inc. **(C)**
BALTIMORE—Tilley Chemical Company **(T)**

MASSACHUSETTS
BOSTON—Howe and French, Inc. **(C M)**
BOSTON—Linder and Company, Inc. **(C M P T)**
BOSTON—McKesson & Robbins, Inc. **(C M P T)**
EVERETT—Sessions-Gifford Co., Inc. **(C M P T)**
FRAMINGHAM—Axton-Cross Corp. of Mass. **(C P T)**
HINGHAM—Stephen-Roger, Inc. **(C M P T)**
HOLYOKE—Eastern Chemicals, Inc. **(M)**
SPRINGFIELD—Chemical Corporation **(C M P T)**
SPRINGFIELD—Hampden Color & Chem. Co. **(C M P)**
STONEHAM—George Mann & Company, Inc. **(C M P T)**
WORCESTER—George H. Clark and Co. **(C M P T)**

MICHIGAN
DETROIT—Eaton Chemical & Dyestuff Company **(C M)**
DETROIT—Manpro Corporation **(C M P T)**
DETROIT—McKesson & Robbins, Inc. **(C M P T)**
DETROIT—Western Solvents & Chemicals Company **(C M P)**
DETROIT—Whitfield Chemical Company **(P)**
ESCANABA—Haviland Products Company **(C M P)**
FERNDALE—Manpro Corporation **(C M P T)**
GRAND RAPIDS—Haviland Products Company **(C M P)**
GRAND RAPIDS—McKesson & Robbins, Inc. **(C M P T)**
GRAND RAPIDS—Wolverine Solvents & Chemicals Co. **(C M P)**
LANSING—Carrier Stephens Company **(C M P)**
LANSING—Wheaton Chemical Company **(C P)**
SAGINAW—McKesson & Robbins, Inc. **(C M P T)**

MINNESOTA
MINNEAPOLIS—W. H. Barber Company **(P T)**
MINNEAPOLIS—McKesson & Robbins, Inc. **(C M P T)**
ST. PAUL—Lyons Chemicals, Inc. **(C M P)**

MISSISSIPPI
JACKSON—F. H. Ross & Company, Inc. **(C M P)**

MISSOURI
KANSAS CITY—McKesson & Robbins, Inc. **(C M)**
KANSAS CITY—Missouri Solvents and Chemicals Co. **(C M P)**
KANSAS CITY—Sherwood and Company, Inc. **(C M P T)**
ST. LOUIS—McKesson & Robbins, Inc. **(C M P T)**
ST. LOUIS—Independent Oil Company **(C M P T)**
ST. LOUIS—G. S. Robins and Company **(C M P)**
ST. LOUIS—Missouri Solvents and Chemicals Co. **(C M P)**

NEBRASKA
OMAHA—Barton Solvents, Inc. **(C M P T)**
OMAHA—McKesson & Robbins, Inc. **(C M P T)**

NEW JERSEY
BLOOMFIELD—McKesson & Robbins, Inc. **(C M P)**
CAMDEN—Callahan Chemical Company **(C M P T)**
EAST PATERSON—Aetna Color and Chemical Co. **(C M P T)**
MURRAY HILL—American Mineral Spirits Co. **(C M P T)**
NEWARK—American Oil and Supply Co. **(C P)**
NEWARK—National Oil and Supply Company **(C M P T)**
PALISADES PARK—Philip A. Hunt Company **(C)**
PERTH AMBOY—Modern Solvents & Chemicals Corp. **(M P T)**
RIVERDALE—A. H. Mathieu Company **(P)**
SOUTH KEARNY—American Chemicals, Inc. **(C M P T)**
VINELAND—Lirio Chemical Company **(C P T)**

NEW MEXICO
ALBUQUERQUE—Braun Chemical Company **(C M P T)**
ALBUQUERQUE—Edmunds Chemical Company **(C M P T)**

NEW YORK
ALBANY—Krackler & Campbell, Inc. **(M)**
ATHENS—Spick Products Company **(P T)**
BINGHAMTON—Collier Chemicals, Inc. **(P T)**
BRONX—Elco Solvents Corporation **(M P T)**
BROOKLYN—Enequist Chemical Company **(C P)**
BUFFALO—Buffalo Solvents and Chemicals **(C M P)**
BUFFALO—Chemical Sales Corporation **(C M P T)**
BUFFALO—McKesson & Robbins, Inc. **(C M P T)**
GARDEN CITY—Hogan Industrial Supply Corp. **(C M P T)**
GLOVERSVILLE—Eastern Chemicals, Inc., S. H. Ireland Div. **(C M)**
KEARNY—American Chemicals, Inc. **(C M P T)**
LONG ISLAND CITY—Peerless Oil and Chemical Corp. **(C M P T)**
NEW YORK—American Chemicals, Inc. **(C M P T)**
NEW YORK—McKesson & Robbins, Inc. **(C M P)**
POUGHKEEPSIE—Duso Chemical Company **(C)**
RENSSELAER—Eastern Chemicals, Inc. **(C M)**
ROCHESTER—Chemical Sales Corporation **(C M P T)**
SYRACUSE—Eastern Chemicals, Inc. **(C M)**
UTICA—Monarch Laboratories **(C M P)**

NORTH CAROLINA
CHARLOTTE—F. H. Ross & Company, Inc. **(C M)**
CHARLOTTE—Moreland Chemical Company **(C M P T)**
CHARLOTTE—Southern States Chemical Co. **(C M P T)**
GREENSBORO—F. H. Ross & Company, Inc. **(C M)**

OHIO
AKRON—Farley Solvents Company **(C M P T)**
AKRON—C. P. Hall Company **(C M P T)**
CANTON—Bison Corporation **(C M P)**
CINCINNATI—Amsco Solvents and Chemicals Co. **(C M P)**
CINCINNATI—Chipman Supply Company **(T)**
CINCINNATI—Herbert Chemical Company **(P T)**
CINCINNATI—McKesson & Robbins, Inc. **(C M P T)**
CLEVELAND—Man-Gill Chemical Company **(C P T)**
CLEVELAND—McKesson & Robbins, Inc. **(C M P T)**
CLEVELAND—National Solvents Corporation **(C P T)**
CLEVELAND—Ohio Solvents and Chemicals, Inc. **(C M P)**
CLEVELAND—R. W. Renton Company **(C P T)**
COLUMBUS—McKesson & Robbins, Inc. **(C M P T)**
DAYTON—Industrial Chemical Products Co. **(C P T)**
DAYTON—Ottoson Solvents, Inc. **(T)**
LIMA—Thomson Chemical Company **(C M P T)**
TOLEDO—Inland Chemical Co. **(C M P)**
TOLEDO—Toledo Solvents and Chemicals **(C M P)**
TOLEDO—M. I. Wilcox Company **(C P T)**
YOUNGSTOWN—Rhiel Supply Company **(C M P T)**

OKLAHOMA
OKLAHOMA CITY—McKesson & Robbins, Inc. **(C M P T)**
TULSA—McKesson & Robbins, Inc. **(C M P T)**
TULSA—Chemical Products, Inc. **(C M P T)**

OREGON
PORTLAND—Van Waters & Rogers, Inc. **(C M P)**

PENNSYLVANIA
CONSHOHOCKEN—American Mineral Spirits Co. **(C M P T)**
EASTON—Lehigh Valley Chemical Company **(C M P T)**
ERIE—Monarch Laboratories **(T)**
LEESPORT—R. W. Eaken, Inc. **(C M P T)**
McKEES ROCKS—Apex Soap and Sanitary Corp. **(C P T)**
PHILADELPHIA—Alex C. Fergusson Company **(C P T)**
PHILADELPHIA—McKesson & Robbins, Inc. **(C M P T)**
PHILADELPHIA—Phillips and Jacobs, Inc. **(C M)**
PHILADELPHIA—Pioneer Salt Company **(C M P T)**
PHILADELPHIA—George Senn, Inc. **(C M P T)**
PITTSBURGH—Carmac Chemical Company, Inc. **(C P)**
PITTSBURGH—Carman-Pittsburgh Company, Inc. **(C)**
PITTSBURGH—Ft. Pitt Chemical Company **(C)**
PITTSBURGH—McKesson & Robbins, Inc. **(C M P T)**
READING—Textile Chemical Company **(C P)**
SCRANTON—Scranton Chemical Company **(C P T)**
YORK—Industrial Solvents and Chemicals Co. **(C P T)**

RHODE ISLAND
CRANSTON—Giffordline Chemical Company **(C M P T)**
PROVIDENCE—George Mann & Company, Inc. **(C M P T)**
PROVIDENCE—Sessions-Gifford Company, Inc. **(C M P T)**

SOUTH CAROLINA
CHARLESTON—Burris Chemical Company **(C P T)**
GREENVILLE—F. H. Ross & Company, Inc. **(C M)**
GREENVILLE—Southern States Chemical Co. **(C M P T)**
SPARTANBURG—Moreland Chemical Co., Inc. **(C M P T)**

TENNESSEE
CHATTANOOGA—Chapman Chemical Co. **(C M P T)**
CHATTANOOGA—Wilson Sales Company **(C M P T)**
KINGSPORT—Chem-I-Dent, Inc. **(C P T)**
MEMPHIS—Chapman Chemical Company **(C M P T)**
MEMPHIS—C. P. Hall Company **(C M P T)**
MEMPHIS—Ideal Chemical and Supply Co. **(C M P T)**
NASHVILLE—Chapman Chemical Company **(C M P T)**
NASHVILLE—Wilson Sales Company **(C M P T)**

TEXAS
AMARILLO—State Chemical Company **(C M P T)**
AUSTIN—R. M. Hughes Company, Inc. **(C M P T)**
BEAUMONT—Arthur Dooley and Son **(C M P T)**
CORPUS CHRISTI—McKesson & Robbins, Inc. **(C M P T)**
DALLAS—McKesson & Robbins, Inc. **(C M P T)**
DALLAS—Texas Solvents and Chemicals Co. **(C)**
DALLAS—Van Waters and Rogers, Inc. **(C M P T)**
EL PASO—Baron Chemical Company **(C M P T)**
EL PASO—Braun Chemical Company **(C M P T)**
EL PASO—Mine and Smelter Supply Company **(P)**
FORT WORTH—McKesson & Robbins, Inc. **(C M P T)**
FORT WORTH—Worth Chemical Products Co. **(C M P)**
HOUSTON—McKesson & Robbins, Inc. **(C M P T)**
HOUSTON—W. H. Curtin and Company **(P)**
HOUSTON—Dixie Chemical Company **(C M P T)**
HOUSTON—R. M. Hughes Company, Inc. **(C M P T)**
HOUSTON—Texas Solvents and Chemicals Co. **(C M P)**
HOUSTON—Van Waters and Rogers, Inc. **(C M P T)**
LUBBOCK—State Chemical Company **(C M P T)**
MIDLAND—State Chemical Company **(C M P T)**
ODESSA—McKesson & Robbins, Inc. **(C M P T)**
SAN ANTONIO—R. M. Hughes Company, Inc. **(C M P T)**
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TERMINAL—State Chemical Company **(C M P T)**

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LA CROSSE—North Central Chemicals, Inc. **(M P T)**
LA CROSSE—Wisconsin Solvents & Chemicals Corp. **(C M P)**
MADISON—North Central Chemicals, Inc. **(C M P T)**
MILWAUKEE—Benlo Industrial Chemicals Company **(P T)**
MILWAUKEE—McKesson & Robbins, Inc. **(C M P T)**
MILWAUKEE—Wisconsin Solvents & Chemicals Corp. **(C M P)**
WAUKESHA—F. P. Jay Chemicals, Inc. **(C T)**

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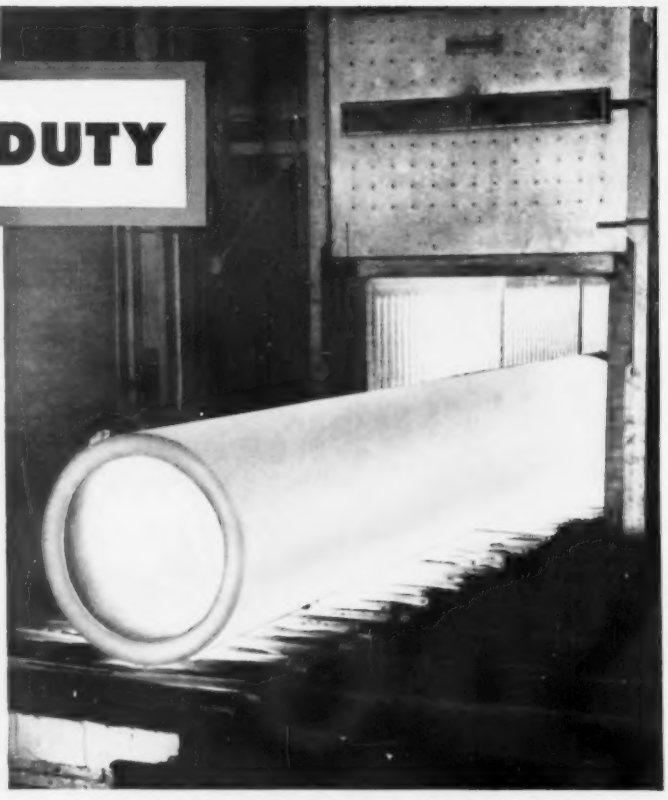
Ask HEVI-DUTY

Sandusky Foundry and Machine Company did...

and now heat treats centrifugal castings of carbon and alloy steel at controlled, uniform temperatures up to 2050° F. with a



Sandusky Foundry and Machine Co. selected this Hevi-Duty Electric Car Bottom Furnace, rated at 2050° F. for their heat treating requirements. Casting being heat treated here weighs 13,700 lbs.

HEVI-DUTY CAR BOTTOM FURNACE

When your heat treating applications demand *quality production at uniform controlled temperatures*, Hevi-Duty can supply either electric or fuel-fired furnaces to meet your requirements.

For example: At Sandusky Foundry and Machine Co., Sandusky, Ohio, centrifugal steel castings up to 50 inches in diameter by 33 feet in length have been heat treated in a Hevi-Duty Electric Car Bottom Furnace. This furnace provides accurately controlled temperatures to 2050° F. in its 6′ x 6′ x 34′ long chamber. They use it to normalize, temper and anneal steel and stainless steel castings. Parts are either air cooled or water quenched.

The Hevi-Duty Car Bottom Furnace features five zones of temperature control, and by placing a dividing wall between the three forward and two rear zones, two separate loads with different temperature ranges can be treated simultaneously. Heating elements in side and end walls, ceiling, door and car bottom, plus three removable air-circulating fans help provide uniformity of temperature.

Whatever your particular heat treating application, there's a Hevi-Duty furnace designed to do the job. Car Bottom Furnaces are available with many arrangements and optional features—single or double end, retort type, controlled atmosphere, forced-air convection and others. Be sure to contact Hevi-Duty first for your heat processing equipment needs.

HEVI-DUTY

A DIVISION OF BPC BASIC PRODUCTS CORPORATION

ASK HEVI-DUTY

for more information on electric or fuel-fired heat treating furnaces. Car Bottom Furnaces are fully described in Bulletin 644R.

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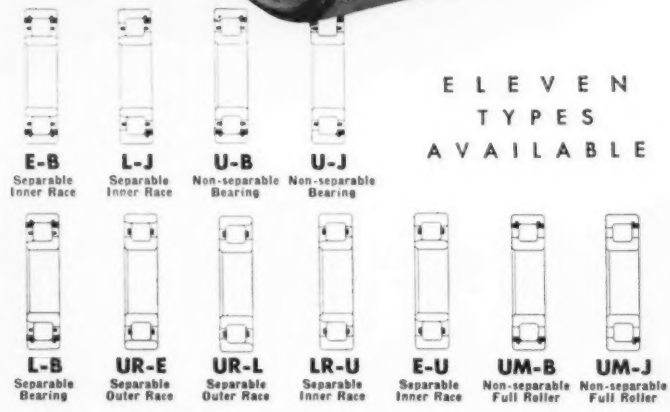

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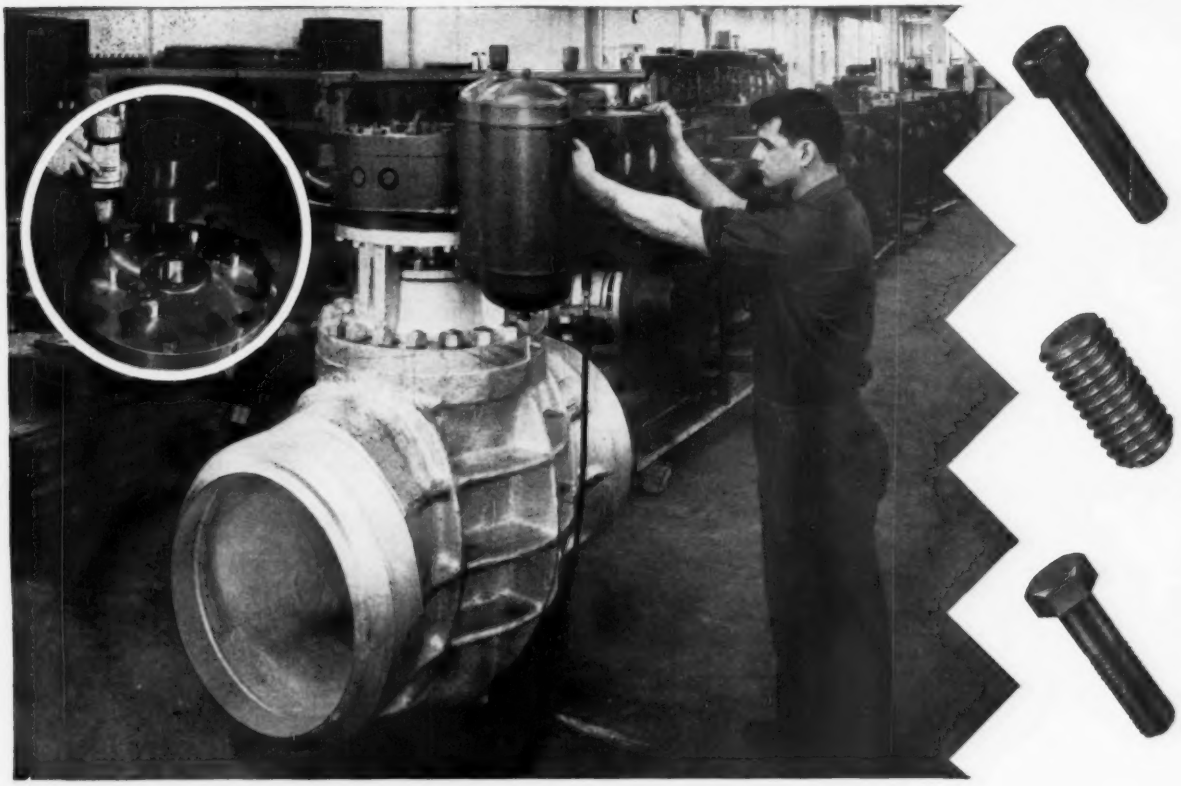
IT PAYS TO STANDARDIZE ON STANSCREW



Stanscrew service adds strength, lowers costs for Shafer Valve Company

The valve operators produced by Shafer Valve Company of Mansfield, Ohio are used to open and close large valves on gas pipe lines . . . often in remote locations, many miles from human supervision. They are subject to sudden surge loads which cause extremely high stresses . . . and their critical importance demands unfailing reliability of all components.

Shafer formerly manufactured their own fasteners for this demanding application from a special high strength steel. Then their distributor arranged for a visit from Stanscrew's fastener specialist. He quickly established that Stanscrew's heat-treated "Carbon Restoration" cap screws, correctly applied, could provide even greater fastener strength . . . and at a significant saving in cost.

The Stanscrew fastener specialist may be able to make similar savings or improvements in your assembly operations. For he brings to your application the experience and facilities which have made Stanscrew a leading supplier of fasteners to the top names in American industry for over 80 years. And he can select money-saving answers to your problems from a complete line of over 5,000 different types and sizes of standard fasteners . . . always in stock, quickly available.

Whatever your fastener requirements, call your nearby Stanscrew distributor today. He will arrange for a prompt visit from the Stanscrew fastener specialist.

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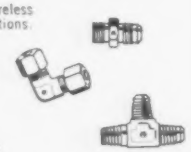

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Completely fabricated with permanently attached swaged ends. Any size, any quantity for working pressures up to 10,000 p.s.i.

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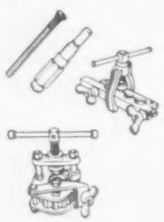

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Screw machine parts made to your specifications . . . any machinable material. Write for information.

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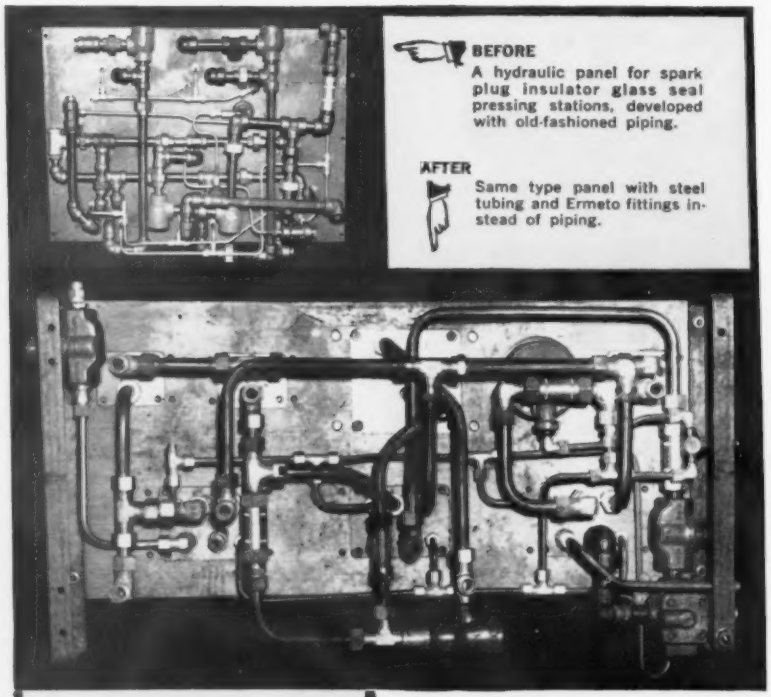


BEFORE
A hydraulic panel for spark plug insulator glass seal pressing stations, developed with old-fashioned piping.

AFTER
Same type panel with steel tubing and Ermeto fittings instead of piping.

Idea submitted by:

William T. Bayley
A.C. Spark Plug Division, G.M.C.
Flint, Michigan

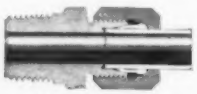
The photographs above show *before* and *after* views of hydraulic panels for a spark plug insulator assembly application which uses a petroleum base fluid operating under 700 p.s.i. at 115°F. Six machines were originally piped as shown in the *before* photograph. As Mr. Bayley states, "Considerable leakage at the many pipe threads was encountered, resulting in frequent maintenance. Oil leakage of these *before* units eventually resulted in operator injury.

"The *after* photograph shows one of the six panels repiped with Ermeto fittings and steel tubing. The results have been a 100% reduction of maintenance and oil leakage, reduced turbular flow, with a much neater installation operating at smoother and cooler rates.

"Ermeto fittings were selected because they were proved best from our tests. The superior grip on the tubing by Ermeto fittings survives shock and vibration, resulting in fewer leaks and less maintenance.

"The savings in maintenance of the six units *after* repiping amounts to approximately $2000 a year. This is chiefly in labor."

Find out how Ermeto fittings can help you reduce maintenance costs and improve system efficiency . . . *write today.*



Ermeto hydraulic fittings are unmatched for positive high pressure control. Available in stainless or carbon steel with "Weathercote" or Cadmium finish in 1/4" to 2" sizes.

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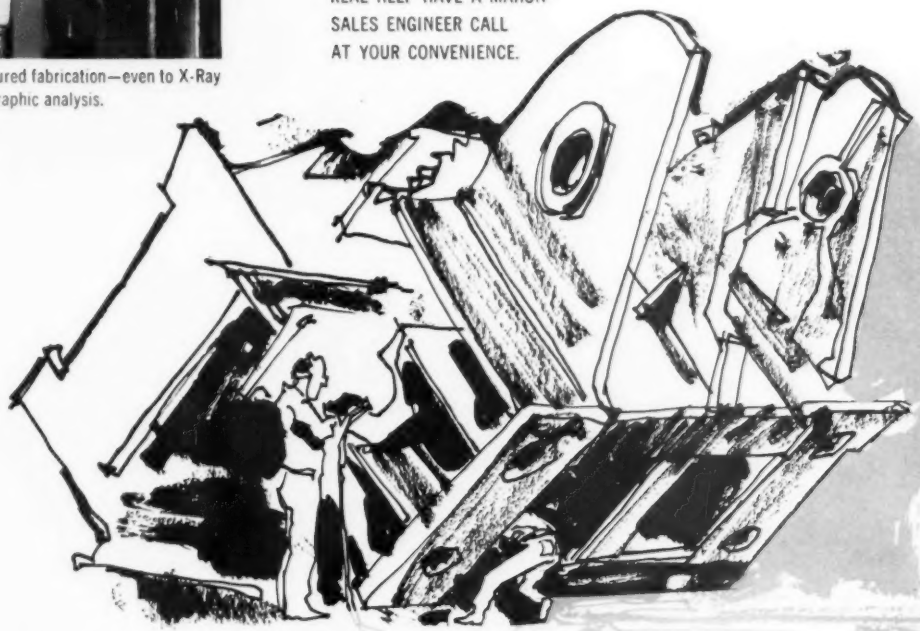

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The deck is cleared for action...

In this production-designed Butler building

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This is a Butler building—all 222,000 square feet of it. It belongs to Flick-Reedy Corp., Chicago, whose Miller Fluid Power division manufactures air and hydraulic cylinders. Frank Flick, president, says the working conditions in this building promote employee comfort, safety and convenience. This spells high morale, a key factor in quality production.

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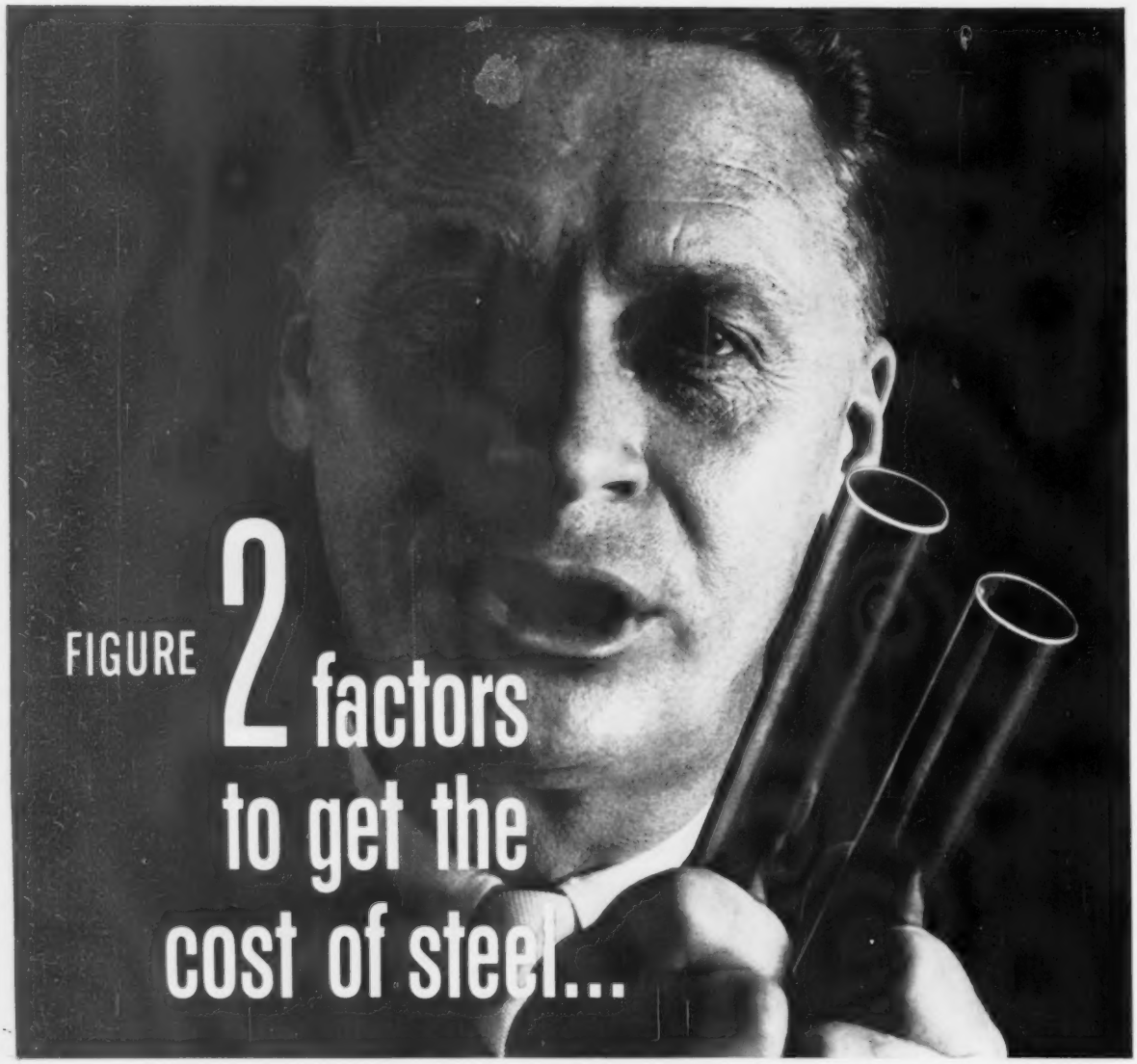

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You can avoid this. Many smart cost-minded steel users are buying all or a major part of their steel needs from Steel Service Centers. They get stock cut-to-size and delivered promptly.

Couldn't this save you money too, by reducing the costs of storage, space, handling, cutting, waste and obsolescence?

Next time you order steel, compare price plus cost of possession with what Service Center steel would cost you. For more information, get the booklet, *What's Your Real Cost of Possession for Steel?* from your nearby Steel Service Center. Or write Steel Service Center Institute, Inc., 540-D Terminal Tower, Cleveland 13, Ohio.

STEEL SERVICE CENTER INSTITUTE

...YOUR STEEL SERVICE CENTER

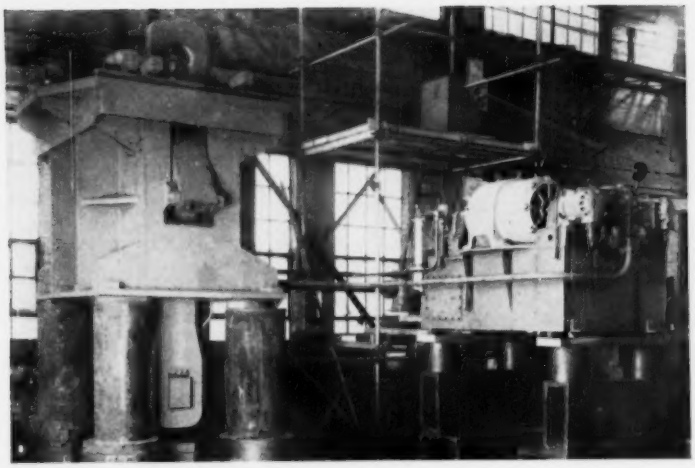
COST OF POSSESSION FOR STEEL IN YOUR INVENTORY

Per ton delivered	_____
Cost of capital:	
Inventory	_____
Space	_____
Equipment	_____
Cost of operation:	
Space	_____
Materials handling	_____
Cutting & burning	_____
Scrap & wastage	_____
Other costs:	
Obsolescence	_____
Insurance	_____
Taxes	_____
Accounting	_____
TOTAL	_____

COST OF FREEDOM-FROM-RISK STEEL FROM YOUR STEEL SERVICE CENTER

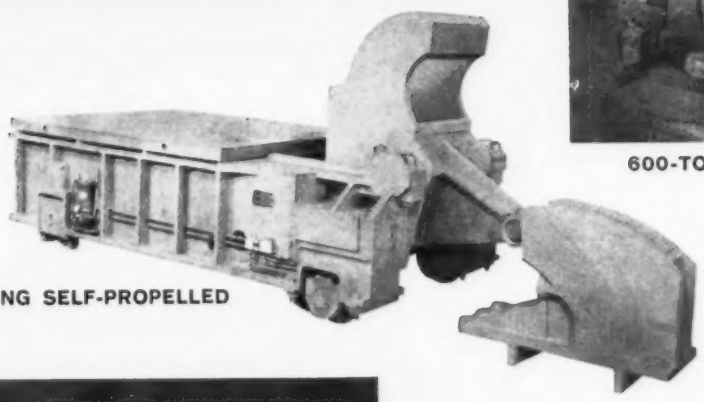
Per ton, cut-to-size, and delivered

TOTAL_____



800-TON INGOT STRIPPER

600-TON INGOT STRIPPER



FORWARD-TILTING SELF-PROPELLED INGOT BUGGY

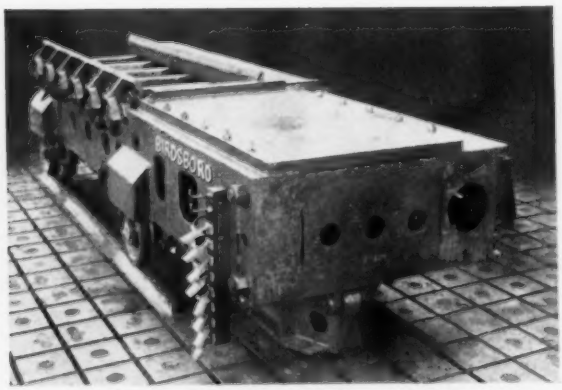
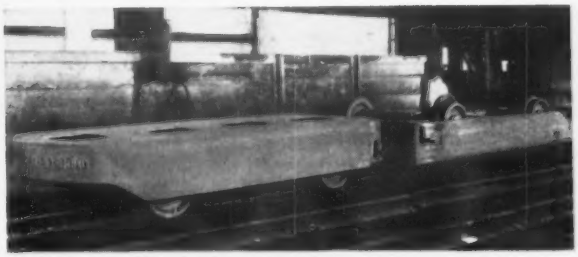


TABLE-TYPE SELF-PROPELLED INGOT BUGGY



INGOT TRANSFER CARS

SIDE-DUMP INGOT BUGGY

Ingot Handling Equipment *designed and built by*

BIRDSBORO CORPORATION

STEEL MILL MACHINERY • HYDRAULIC PRESSES • CRUSHING MACHINERY • SPECIAL MACHINERY • STEEL CASTINGS
Weldments "CAST-WELD" Design • ROLLS: Steel, Alloy Iron, Alloy Steel • BIRDSBORO, PENNSYLVANIA

LIMA

How Ohio Steel Foundry saves time and money with versatile Lima truck crane

Magnet-equipped Lima 24-T truck crane breaking scrap at The Ohio Steel Foundry Company, Springfield, Ohio.

"I certainly am impressed with the versatility of our Lima 24-T truck crane. It does so many things, and does them so well, that we do not require additional equipment for special tasks.

"We have magnet, hook and clamshell attachments, permitting us to handle scrap metal, sand, coal, foundry flasks, and alloy metals. We also use the crane for plant maintenance, handling heavy machinery, and moving railroad cars about the plant. Air controls make the 24-T easy to operate with precision. Distributor service is excellent." — *says Maintenance Engineer, Carl D. Hoyt, The Ohio Steel Foundry Company, Springfield, Ohio.*

Learn all about money-saving, high-performance Limas. There's a type and size for every job requirement. Shovels to 8 yds.; crawler cranes to 140 tons, 75 tons on rubber; draglines variable. Choice of power. For facts and figures, get in touch with your nearest Lima distributor or write Construction Equipment Division, Baldwin-Lima-Hamilton Corporation, Lima, Ohio.

New Lima 5-yd. Front Loader—economical way to handle bulk materials faster!

DISTRIBUTORS IN PRINCIPAL CITIES OF THE WORLD

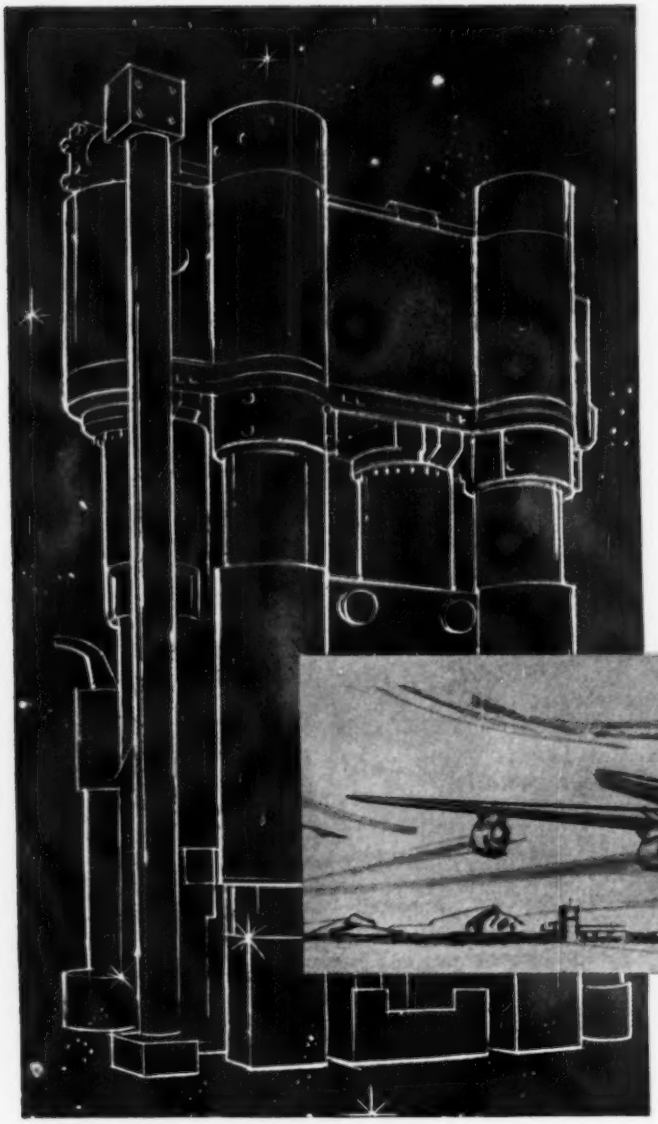
LIMA Construction Equipment Division, Lima, Ohio

BALDWIN · LIMA · HAMILTON

6022

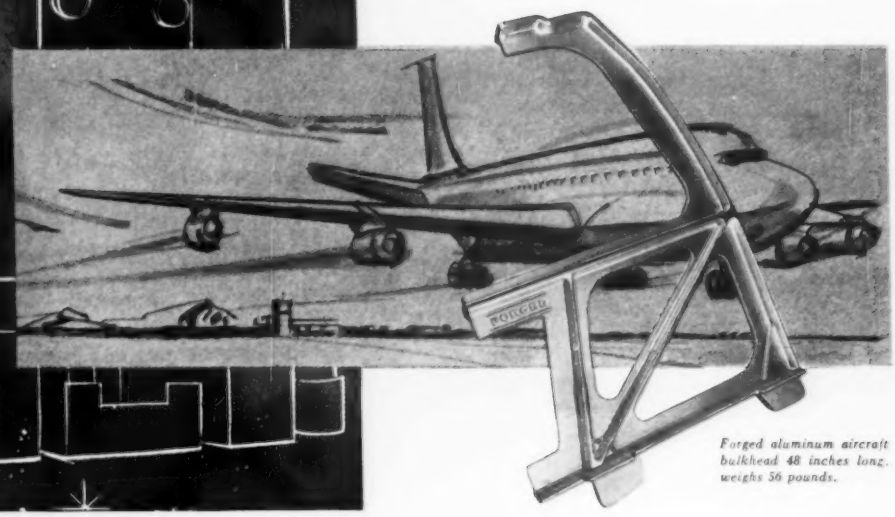
Shovels • Cranes • Draglines • Pullshovels • Roadpackers • Crushing, Screening and Washing Equipment

BALDWIN BLH LIMA-HAMILTON



Modern hydraulic forging press exerts 35,000 tons pressure.

HOW FORGED PARTS help airplanes haul bigger payloads



Forged aluminum aircraft bulkhead 48 inches long, weighs 56 pounds.

In an airliner, every pound of weight saved is worth hundreds of dollars ... in revenue-making payload. And in military aircraft, pounds saved mean added miles-per-hour ... or added load carried.

In commercial products ... trucks, cars, materials-handling equipment ... the pounds of dead weight you eliminate by using forgings make money year-after-year for the operator. The forging process lets you put the metal exactly where you need it to carry the load, withstand shock or vibration, endure torsion. And with not a surplus ounce of non-working weight going along just for the ride.

Forged parts are the designer's friend ... strong where strength is needed, lowest in weight, twice-worked by original rolling of the best metals *plus* the hammer blows or high pressures of the forging process.

Write for literature to help you specify, design, and procure forged parts.

When it's a vital part, design it to be FORGED

Drop Forging Association • Cleveland 13, Ohio

Names of sponsoring companies on request to this magazine

Greater visibility, trimmer lines for the new CHEVROLET, thanks to GAS! This is Libbey-Owens-Ford, where the new panoramic windshields are made for your beautiful new Chevrolet.

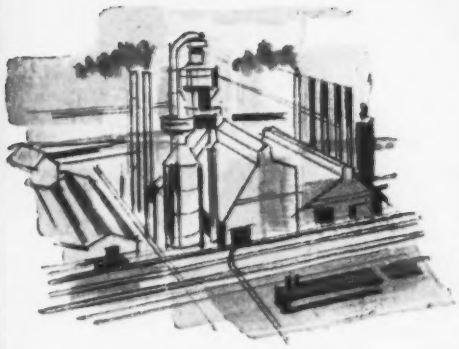
The forming of the curved glass is done in a limited temperature range at which glass can be bent without distortion. The production process challenged heat process engineers to design new automatic equipment capable of mass producing these large precision glass pieces.

LOF engineers, working with General Motors, discovered that Gas could produce the proper time-temperature cycle demanded by this process...efficiently, quickly, reliably.

The flat glass is conveyed under radiant Gas burners which bring the glass quickly up to bending temperature and allow the shaping of windshields, with reproducible uniformity, at high production rates.

The production of the Vista Panoramic windshield is another example of the contributions modern Gas equipment is making to American manufacturing. If your operation includes precise process heating, call your Gas company's industrial specialist and see how you can improve production with modern Gas equipment. AMERICAN GAS ASSOCIATION

FOR PROCESS HEATING GAS IS GOOD BUSINESS



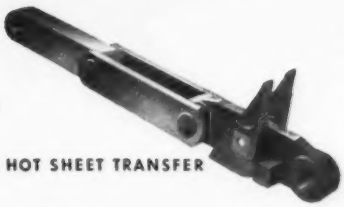
get steel mill toughness

in Jeffrey chains

Starting right with selection of metals to give maximum strength with minimum weight, Jeffrey builds durability into steel mill chains. They are designed for continuous operation. Machining, heat treatment, assembly and inspection are rigidly controlled to Jeffrey's high standards.

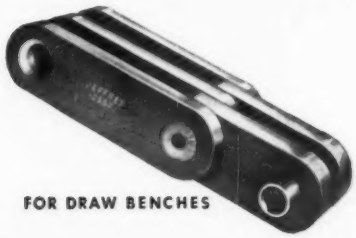
You can select Jeffrey chain and attachments for every steel mill requirement or have them tailor-made to fit the job. The Jeffrey Manufacturing Company, 925 North Fourth Street, Columbus 16, Ohio.

FOR CROP CONVEYORS

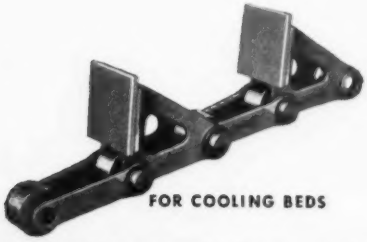


FOR HOT SHEET TRANSFER

FOR HOT COIL CONVEYORS



FOR DRAW BENCHES

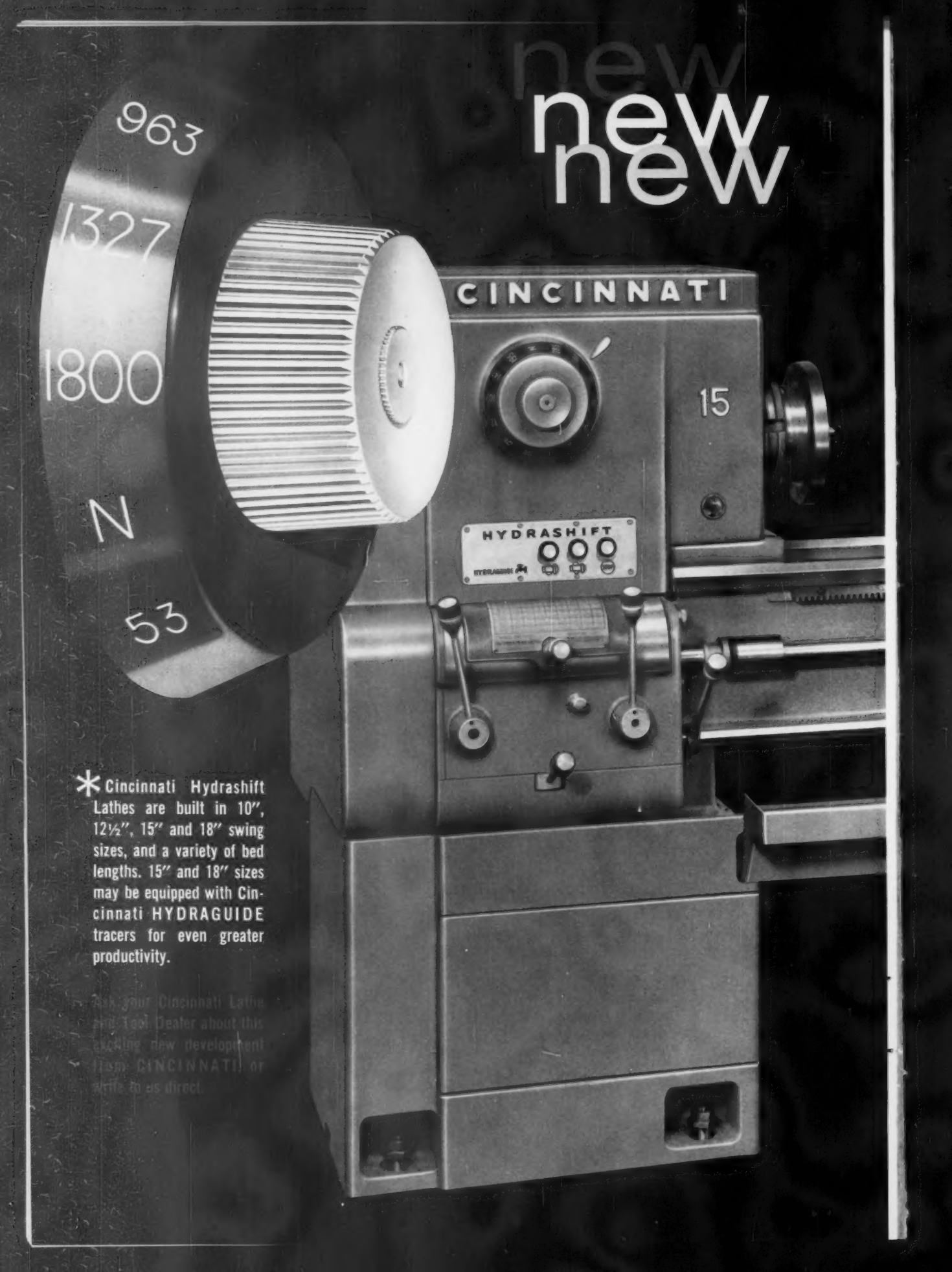


FOR COOLING BEDS

FOR PALLET CONVEYORS

JEFFREY

CONVEYING • PROCESSING • MINING EQUIPMENT...TRANSMISSION MACHINERY...CONTRACT MANUFACTURING



new

*Cincinnati Hydrashift Lathes are built in 10", 12½", 15" and 18" swing sizes, and a variety of bed lengths. 15" and 18" sizes may be equipped with Cincinnati HYDRAGUIDE tracers for even greater productivity.

Ask your Cincinnati Lathe and Tool Dealer about this exciting new development from CINCINNATI or write to us direct.

from cincinnati lathe and tool

CINCINNATI HYDRASHIFT*

The first economy-priced geared head lathe with
POWER DIAL SPEED SHIFTING

HYDRAULIC POWER SUPPLIES THE MUSCLE ON NEW CINCINNATI HYDRASHIFT LATHES

Standard equipment on the new Cincinnati lathes includes HYDRASHIFT, the easiest and fastest method for spindle speed shifting on a geared head lathe. To change spindle speeds, the operator has only to dial the desired RPM . . . *hydraulic power supplies the muscle for the shift.*

New Cincinnati Hydrashift lathes are designed to provide more time for cutting and to reduce operator fatigue to a minimum. Yet, with their many new operating features, *they are still in the economy price class.*

new . . . FROM HEADSTOCK TO TAILSTOCK

new High Speeds with All-Geared Headstock—husky Hydrashift gearing provides 12 speeds in geometric progression up to 3000 RPM.

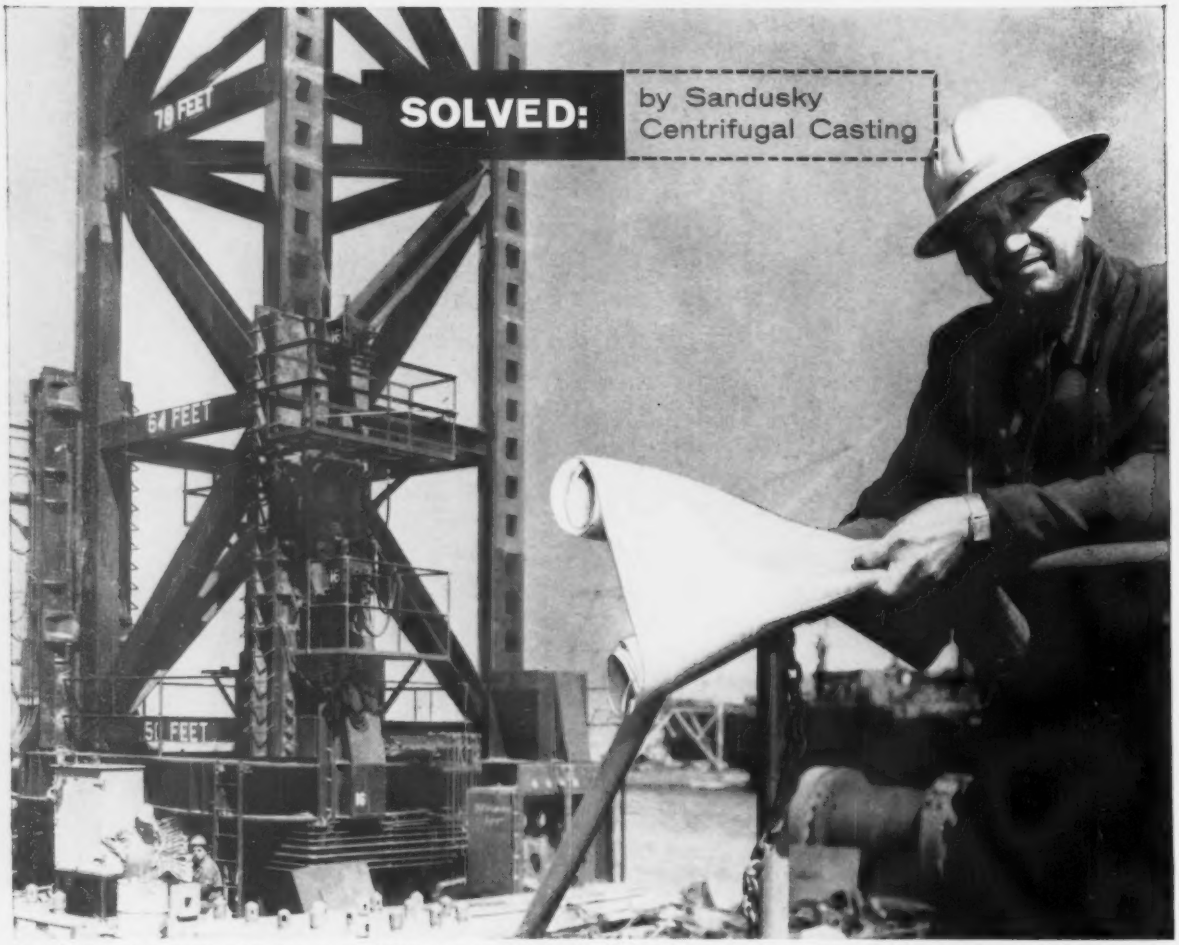
new Compound and Cross Slide—wider, stronger for heavy, high speed cuts; large, easy-read dials for greater accuracies—with more operator speed and convenience.

new Quick-Clamping Tailstock—Cincinnati's unique tailstock design is even more versatile for fast tailstock positioning.

plus NEW greater horsepower . . . NEW husky beds with "Hardclad" flame-hardened ways . . . NEW coded pushbutton controls . . . NEW chip pan slides in and out for convenient cleaning! . . . Totally enclosed quick-change feed box with 48 threads and feeds . . . and many other exclusive features on the

NEW CINCINNATI HYDRASHIFT LATHES

cincinnati lathe and tool co.
3207 Disney Street, Cincinnati 9, Ohio
"HYDRASHIFT" Lathes / "CINCINNATI" Drilling Machines / "SPIROPOINT" Drill Sharpeners



One of four 274 ft. high towers aboard the *George F. Ferris* showing method of installing hydraulic jacks built by Yuba Manufacturing Division, Yuba Consolidated Industries, Benicia, Calif. George Bauer, of Delong Corp., New York, is shown supervising construction while platform is being completed at Yuba's Richmond, Calif., plant.

YUBA gets quality-cost-delivery advantages by specifying 16 Sandusky cylinders

Sixteen 500-ton hydraulic jacks built by Yuba, for which Sandusky supplied the main cylindrical bodies, enable the new pipe-laying barge, *George F. Ferris*, to operate in waters 200 ft. deep!

This 5400-ton barge is equipped with four structural steel towers 274 ft. high. Four jacks on each of the towers provide the power to lower these steel "legs" to the ocean floor, raise the barge above the surface of the water, or retract the towers to render the barge navigable. The steel jack cylinders are Sandusky Centrifugal Castings, made to the requirements of ASME Code-approved SA-217, Section VIII, Unfired Pressure Vessels, to withstand operating pressures of 3000 psi. They were produced in 186" lengths, machined to 24" O.D. with 2" thick walls and sectioned into four pieces 43" long.

Yuba's selection of Sandusky Centrifugal Castings was based largely on three essential factors. QUALITY—meeting the exacting Code requirements . . . COST—saving about half the cost of an alternate method of manufacture and DELIVERY—coming through on a tough time schedule by delivering all 16 cylinders within 21 working days!

When you need cylinders from 7" to 54" in O.D. and up to 33 feet long it will pay you to get in touch with us. Write for our latest booklet, *Your Solution To Cylindrical Problems* containing data on more than 70 ferrous and non-ferrous alloys.

SANDUSKY CENTRIFUGAL CASTINGS
FOUNDRY & MACHINE CO.

5902

SANDUSKY, OHIO—Stainless, Carbon, Low-Alloy Steels—Full Range Copper-Base, Nickel-Base Alloys

CARBON AND ALLOY STEEL INVENTORIES...

They can and will—if you let *Frasse* stocks be your inventory! Your cost for steel ready for use will be less. You'll save the cost of labor, handling, processing and obsolescence...free plant space and idle capital for profitable use. You incur no expense until material is needed...then only the cost of steel—*not* the purchase price PLUS the *high cost of possession.*

With Frasse stocks as your inventory, you can pick from 20 different grades—any one of 2001 sizes. For, Frasse carries a complete range of carbon bars and shafting as well as commercial and aircraft quality alloys. There's always a size and grade for any application...*immediately available.*

Weigh the advantages of this modern solution to steel inventory problems. You get broad selection, fast deliveries—and the help of specialists that offer a wealth of technical information and problem-solving techniques. Place future orders for the carbon and alloy bars you need with Frasse—*your* Steel Service Center. You'll find it convenient...and far more economical than maintaining your own inventory.

Call FRASSE 1st for

COMPLETE

CARBON AND ALLOY STEEL SERVICE

Frasse Carbon and Alloy Stocks Include:

C1018	C1137	E9310
C1045	C1212	E4130
B1112	C1213	4140
B1113	Ledloy	4142
B1113X	4615	E4340
C1117	8620	E8740

4140 H.T. • 4142 H.T.

Precision Shafting • Special Finish
Turned & Polished Shafting • Drill Rod
4130 Aircraft Quality Sheets

AMERICAN STEEL WAREHOUSE ASS'N
YOUR STEEL SERVICE CENTER

Peter A. Frasse & Co., Inc.

New York 13, N.Y.	Philadelphia 29, Pa.	Buffalo 7, N.Y.	Syracuse 1, N.Y.	Hartford 1, Conn.
17 Grand St.	3911 Wissahickon Ave.	P.O. Box K, Sta. B	P.O. Box 1267	P.O. Box 1949
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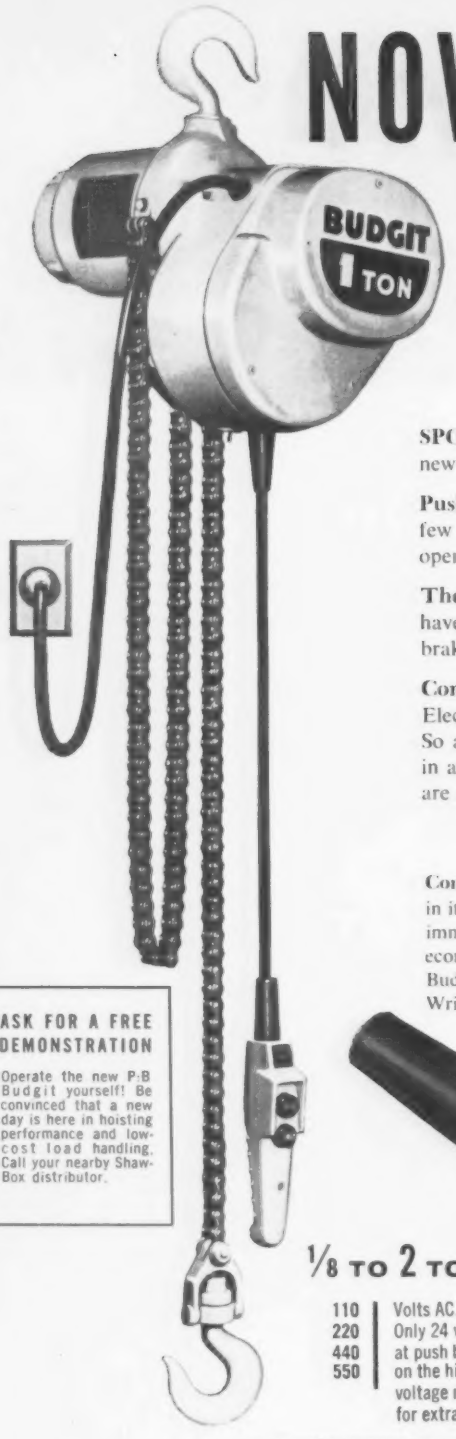
NOW P:B BUDGIT®

ELECTRIC HOIST

"FRACTURES FRACTIONS"



SPOTTING speed and accuracy are "right on the button" with this new Push Button Budgit Electric Hoist.

Push button action is so sensitive you can spot loads precisely in a few ticks of time. The control station fits the palm for one-hand operation, leaving the other hand free to guide the load.

The P:B Budgit has two automatic brakes. Heavy-capacity cranes have the same type of load brake. It's the only hoist with mechanical brake built into the motor. Each brake alone can hold the load.

Compartmented components add still more value to the P:B Budgit Electric Hoist. All electricals are enclosed, safe from dirt and moisture. So are the motor and motor brake. Gearing and load brake operate in an oil bath, sealed against airborne substances. Maintenance needs are simple as can be.

SEE BULLETIN FOR DETAILS

Compare the new P:B Budgit Hoist with any other electric in its class. It's a portable hoist you hang up, plug in, and use immediately with top efficiency, safety, convenience, and economy. Get full details, plus data on pull cord operated Budgit Hoists in AC, DC, and 12-volt battery powered models. Write for Bulletin 15010-15C today.

ASK FOR A FREE DEMONSTRATION

Operate the new P:B Budgit yourself! Be convinced that a new day is here in hoisting performance and low-cost load handling. Call your nearby Shaw-Box distributor.

1/8 TO 2 TONS

110 | 220 | 440 | 550 — Volts AC. Only 24 volts at push buttons on the higher voltage models for extra safety.

AUTHORIZED SERVICE STATIONS from coast to coast save time, trouble, and money for every Budgit user.

60 A-1

MAXWELL MANNING M&M & MOORE INC. TRADE MARK

BUDGIT ELECTRIC HOISTS

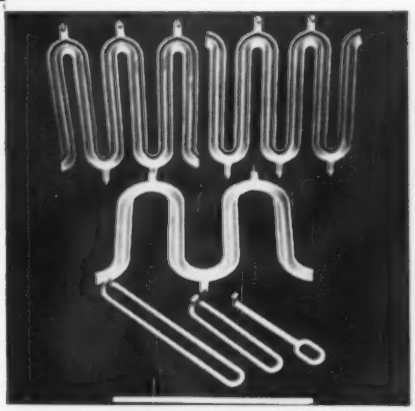
A Product of

MANNING, MAXWELL & MOORE, INC.

Shaw-Box Crane & Hoist Division • Muskegon, Michigan
In Canada: Manning, Maxwell & Moore of Canada, Ltd., Galt, Ontario

Duraloy Tubes and Grids *to Meet Exacting* THE ELECTRIC EF FURNACE CO. GAS • OIL • ELECTRIC *Specifications*

Duraloy Centrifugally Cast Tubes 7'9" long, 7" O.D., ⅜" wall. 28 Cr 10 Ni; some of HOM alloy.



Duraloy Resistance Grids—Shell Molded. 18 Cr 38 Ni; some of special HOM alloy.

Heat treating furnaces need high alloy castings... radiant heat tubes for gas or oil fired... resistance grids for electrical... and castings for handling material through the furnace. *And the castings must be fail-proof!*

One reason—indeed the major reason—why The Electric Furnace Company, Salem, Ohio, has leaned so heavily on Duraloy for its castings is that over the years Duraloy Castings have established a fine record for durability and uniformity. And with the recent development of Duraloy HOM, the furnace company can work towards higher temperature operations. HOM can be used quite broadly at temperatures up to 2200°F and in a limited way to 2300°F. It can be cast statically, centrifugally and shell molded.

When such an authority on heat treating furnaces as Electric Furnace so consistently selects Duraloy castings for these furnaces on which it has built an enviable reputation... that preference suggests quite strongly that Duraloy castings are consistently sound and skillfully alloyed to meet exacting high temperature applications. This same skill offers comparable values to all who require high alloy castings.

Annealing furnace designed and constructed by The Electric Furnace Company used for cycle annealing of enameling iron strip and bright annealing of cold rolled strip. Three methods of heating: direct fuel fire; fuel fired radiant heat; and electric resistance used in the various zones.

The DURALOY Company

OFFICE AND PLANT: Scottdale, Pa.

EASTERN OFFICE: 12 East 41st Street, New York 17, N. Y.
ATLANTA OFFICE: 76—4th Street, N.W.
CHICAGO OFFICE: 332 South Michigan Avenue
DETROIT OFFICE: 23906 Woodward Avenue, Pleasant Ridge, Mich.

Plan with your AIM*. . . Edgcomb Steel and Aluminum does . . .

Powered Machine aids effortless coil strapping

EDGCOMB STEEL AND ALUMINUM CORPORATION, HILLSIDE, N. J., and their Acme Idea Man developed a faster, easier way to handle and strap heavy coils of steel with the new Acme Steel F4 Strapping Machine and Indexing Table. (Idea No. S4-10)

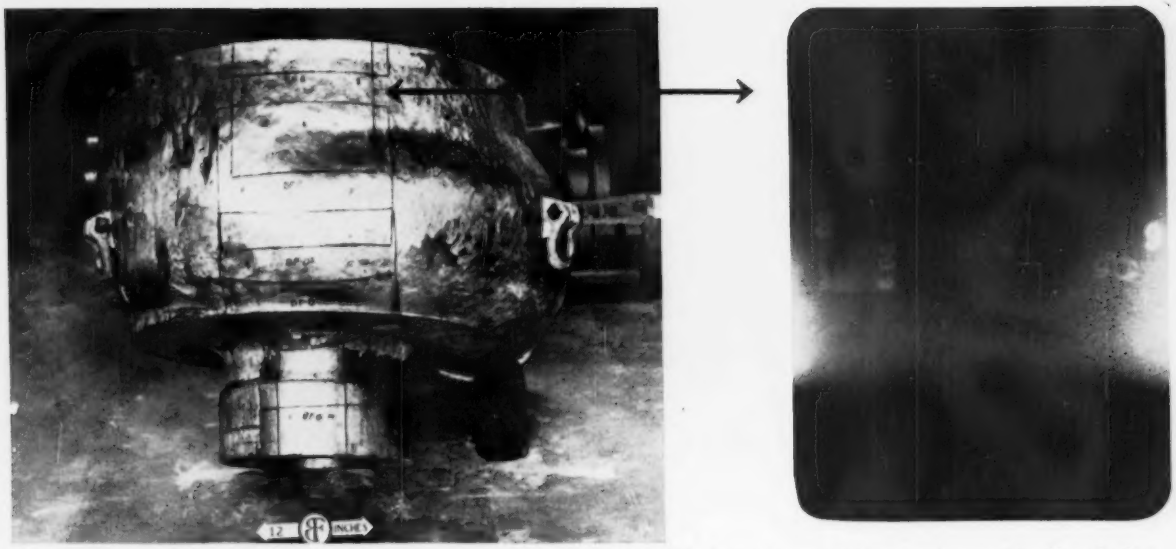
Now Edgcomb Steel and Aluminum has doubled its coil strapping capacity and saves about eight man-hours per shift. Power lifts the coil above the indexing table top on three tapered rollers that rotate the coil for strap placement. The F4 tensions each strap to predetermined tightness, seals and cuts it. The F4 has unlimited strap feed and take-up, and makes its own seals from a coil.

Acme Idea Man, C. A. Lested, serves many companies with time and money-saving ideas.

Ask your Acme Idea Man to show you the new 10 minute movie on this equipment.

***Plan with your Acme Idea Man.** Backed by Acme Steel engineers, he can help adapt Acme Steel Strapping Machines to your needs. Call him or write: Dept. IFS-30, Acme Steel Products Division, Acme Steel Company, Chicago 27, Illinois. In Canada, Acme Steel Company of Canada, Limited, 743 Warden Ave., Toronto 13, Ontario.

ACME STEEL **STEEL STRAPPING**



Marks on the casting show positions of the films during exposure. Above, radiograph of the area indicated.

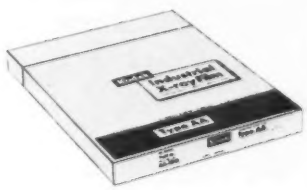
5 tons of stainless casting... Radiography goes over it inch by inch

Pumping radioactive water calls for pump castings that are flawless. Bonney-Floyd Company, one of the largest producers of steel castings for nuclear power use, makes sure of quality through radiography with Kodak Industrial X-ray Film.

Made of CF8(18-8) stainless steel, this casting will become the casing for the primary coolant pump for a large land-based nuclear power plant. Since this pump will handle radioactive water, utmost quality is required. To be sure of this quality, the Bonney-Floyd Company radiographed the entire casting, using their 24-Mev Betatron and Kodak Industrial X-ray Film, Type AA.

This is another example of how radiography provides assurance that only high-quality work is delivered to the customer. It is a way reputations for fine work are built.

You should take advantage of radiography. If you would like to know how it can work profitably for you, talk it over with an X-ray dealer or write us for a Kodak Technical Representative to call.

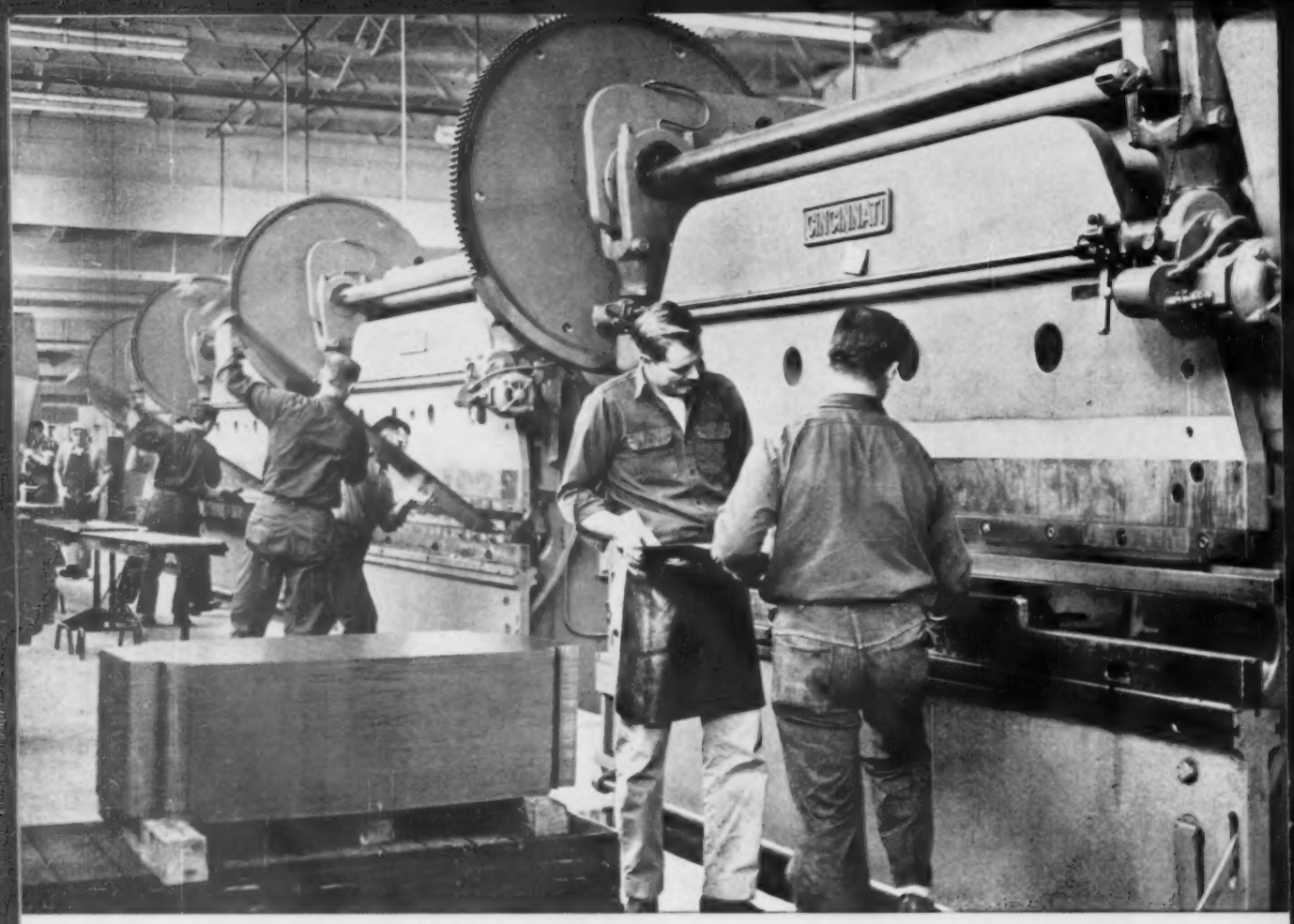


Read what Kodak Industrial X-ray Film, Type AA, does for you:

- Speeds up radiographic examinations.
- Has high film contrast, giving increased detail visibility and easy readability at all energy ranges.
- Provides excellent uniformity.
- Reduces the possibility of pressure desensitization under shop conditions.

EASTMAN KODAK COMPANY
X-ray Division Rochester 4, N.Y.

Kodak
TRADE MARK

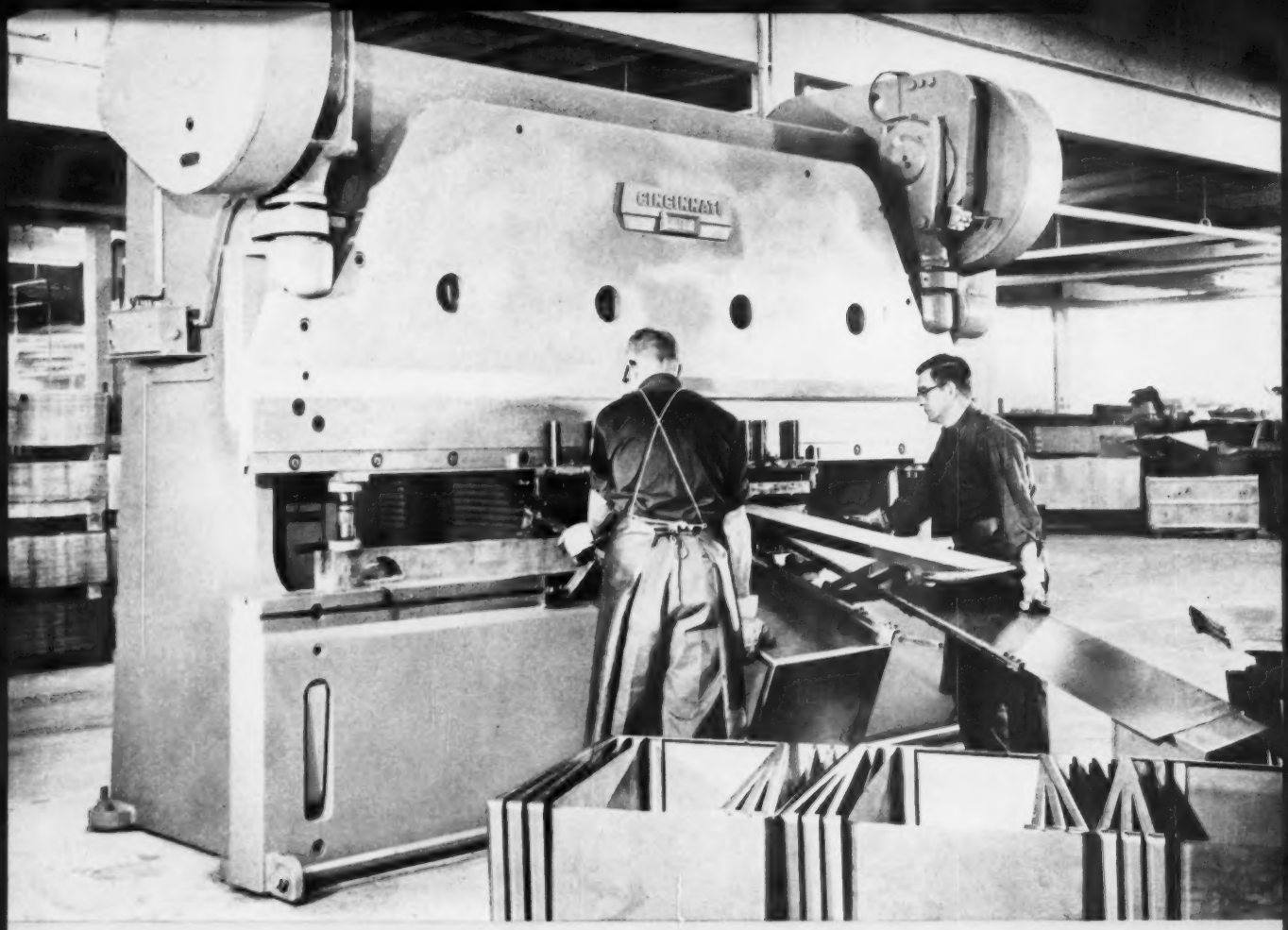


Courtesy Steelcase, Inc., Grand Rapids, Michigan

Efficiency

THESE CINCINNATI® PRESS BRAKES

"A million hits a year; downtime nil for 20 years." That's the story of these Cincinnati press brakes at Steelcase, shown forming 7/16" offset on four sides of a desk top. The ruggedness of these veteran machines "permits the operator to perform high speed pedaling with excellent control." Proof, again, of the reliability built into every Cincinnati press brake.



jumps 50%

FORM PROFITS FOR STEELCASE, INC.

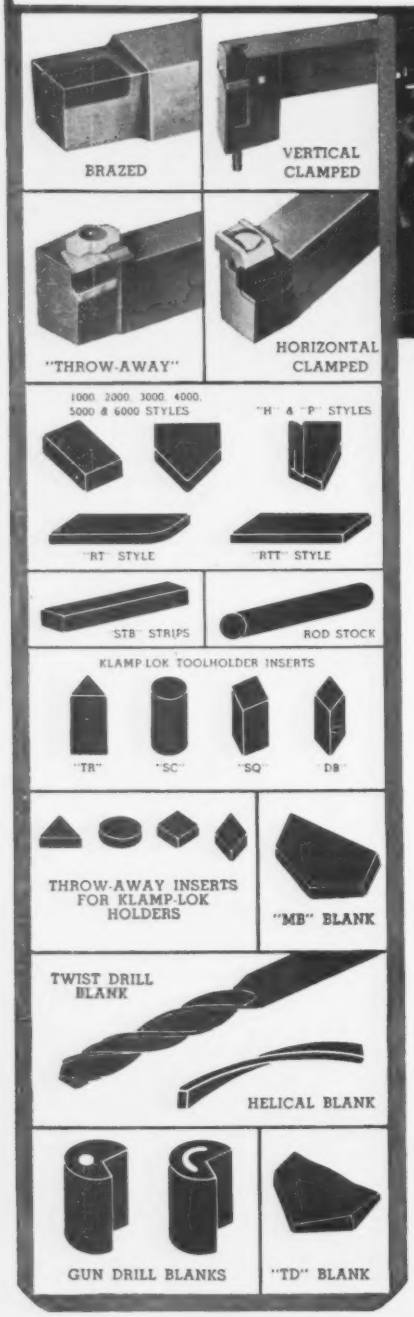
50% more efficient than previous method, this 225-ton Cincinnati forms four radius corners on pedestal bodies. "High degree of accuracy and convenient operation," according to Steelcase, help operators produce 80 pieces per hour. The machine operates more quietly and takes less floor space than their previous equipment.

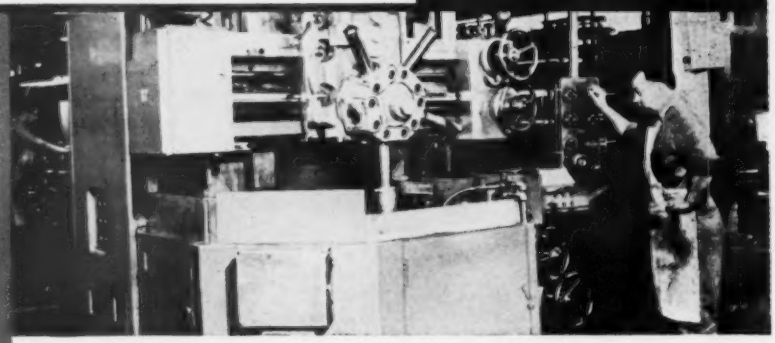
Shapers / Shears / Press Brakes

THE **CINCINNATI SHAPER** CO.

Cincinnati 11, Ohio, U.S.A.

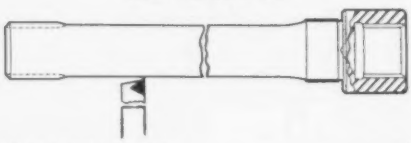
TALIDE TOOLS Produce 50% More at J.I.CASE®



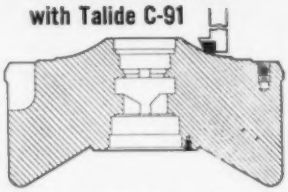


J.I.CASE® Co., Racine, Wisconsin, leading manufacturer of Agricultural and Industrial Equipment, reports Talide Tools give superior performance on both cast iron and steel jobs.

18 Shafts machined with Talide S-92



600 Wheels machined with Talide C-91



Main drive shaft 15/16" dia. x 16-15/32" long	**Part**	Rear tractor wheel 15" dia. x 7-19/32" thick
H.R. A-8640 steel 285-321 Brinell	**Material**	Hi-nickel cast iron SAE111
Turn O.D. of Shaft	**Operation**	Face outer edge of wheel hub, 1/2" wide cut
Carbo-matic	**Machine**	Bullard
#TN-163P3 Talide Disposable insert 1/2" I.C. x 3/16" thick, negative angle, 3/64" corner radii, Grade S-92	**Tools**	#GL-20 brazed tool, off-set style, 1-1/4" x 1-1/4" x 8" shank size, Grade C-91
1/16"	**Depth of Cut**	1/8" to 1/2"
.009	**Feed**	.033
115	**Speed (S.F.M.)**	210
450	**(R.P.M.)**	39
Soluble Oil	**Coolant**	dry
Talide Grade S-92 Machined 18 shafts per grind. Next best premium grade produced only 12 shafts.	**Results**	Talide Grade C-91 Machined 600 wheels per grind compared to 400 for next best premium grade.

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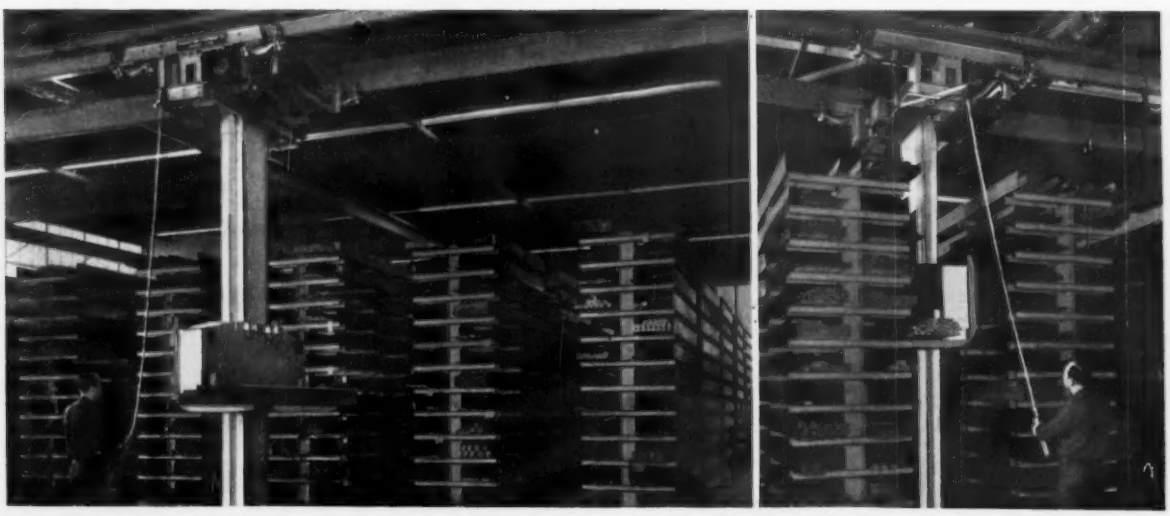
Write for Bulletin C-2.



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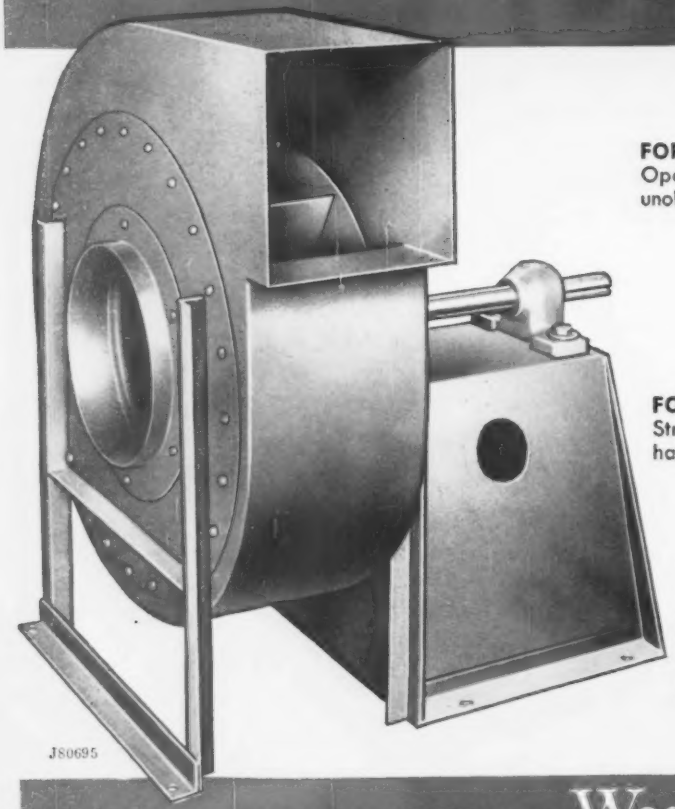

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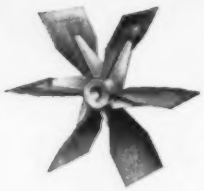
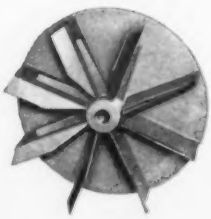


FOR MATERIAL HANDLING: Open radial blade wheel with unobstructed air passages.



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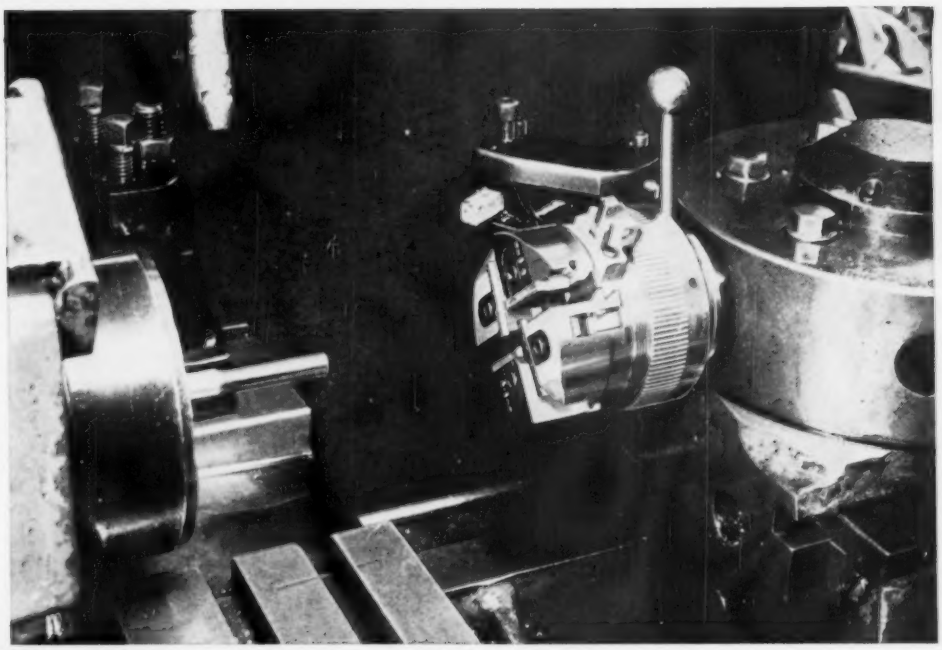
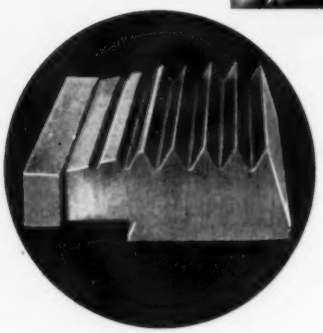




CONCENTRICITY HELD TO .002"

between workpiece O. D. and thread with **LANDIS** *Die Head*

Centering Throat Chasers enabled the LANDMATIC Head to solve a difficult threading problem at the Minneapolis-Honeywell Regulator Co., Valve Division, in Philadelphia, Pa.

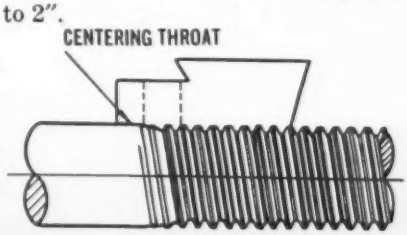
Threads on valve stems for diaphram control valves were required to meet a concentricity tolerance of .002" total indicator reading. The 5HH LANDMATIC Hardened and Ground Head using Centering Throat Chasers is the only head tested capable of producing these results.

These Centering Throat Chasers are specifically designed for producing threads requiring a high degree of concentricity with the outside diameter of the workpiece. As indicated on the drawing, the centering throat section protrudes from the chaser cutting edge—to act as a work-aligning and -supporting surface.

To produce these stems, 3/8" 24-pitch UNF threads are cut 1-5/8" long on 316 stainless steel at 30 SFM to Class 3 tolerances. Entire lots of 400 pieces are run without regrinding the chasers.

LANDMATIC Hardened and Ground Heads are available in four sizes to thread all diameters from 3/16" to 2".

For additional information, please ask for Bulletin F-80.



474

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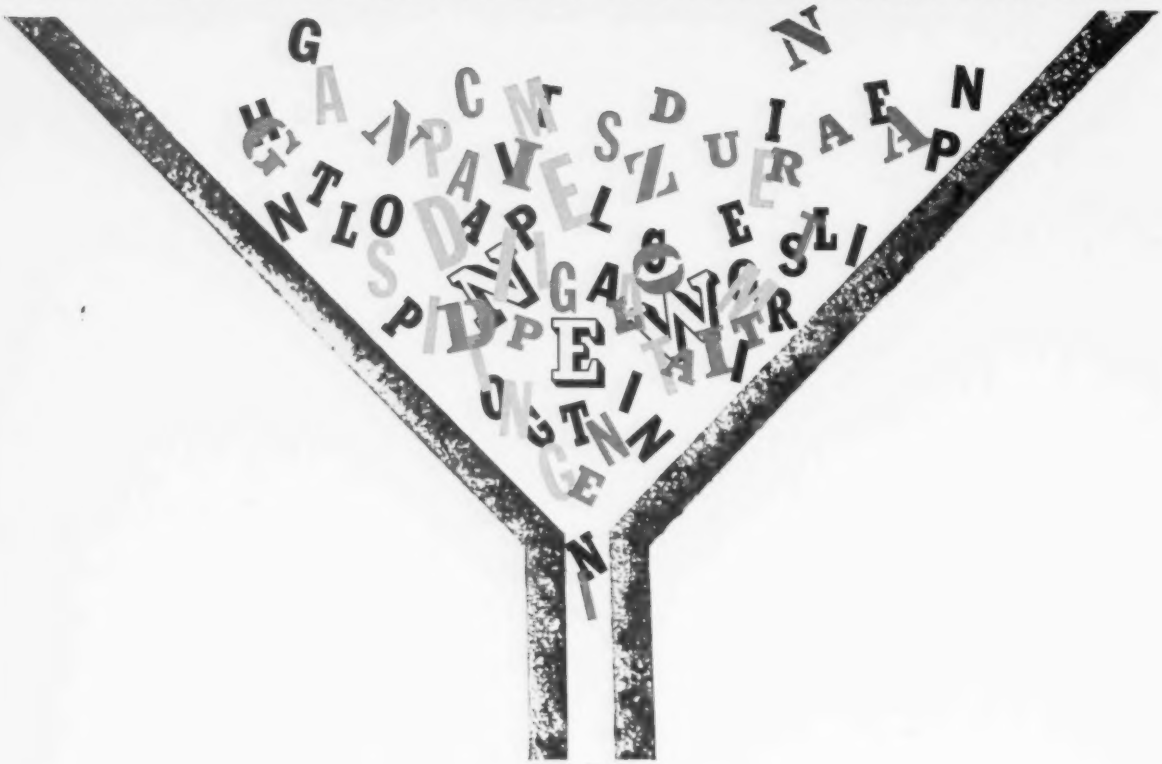
HOW A SINGLE SOURCE SOLVES YOUR PRODUCTION PROBLEMS



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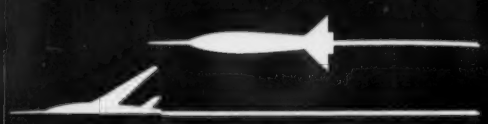

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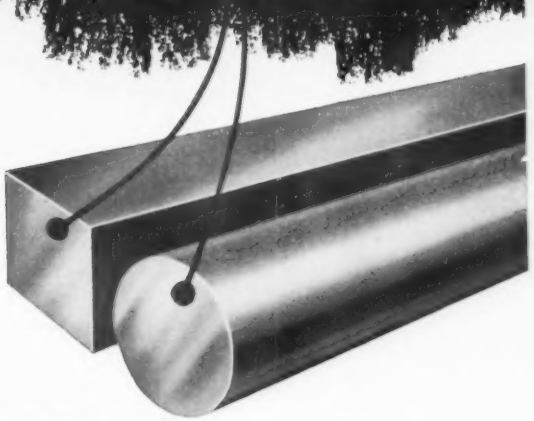

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Property	Mid-Radius		Center	
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Elongation %	4	8	2.5	8
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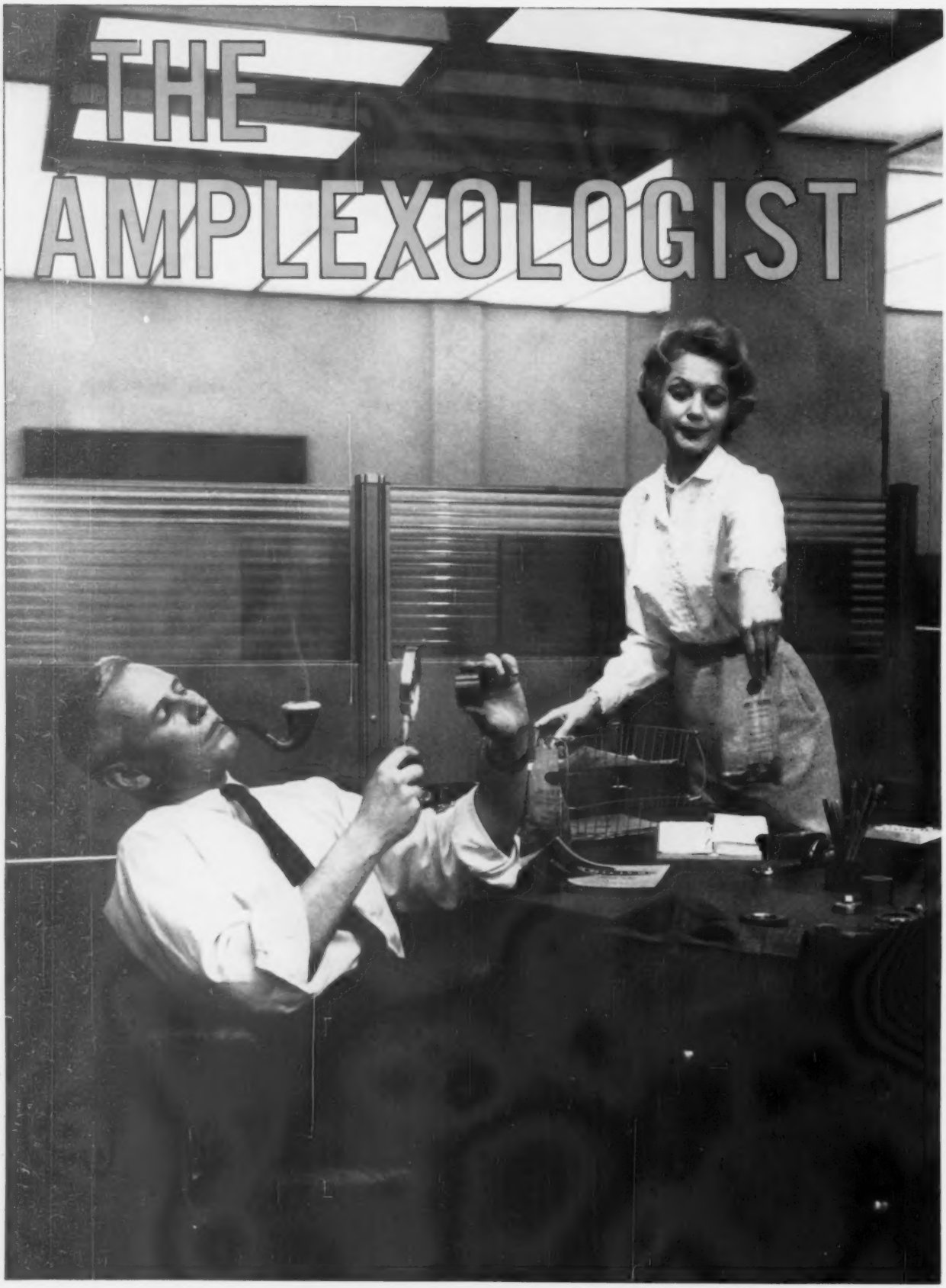
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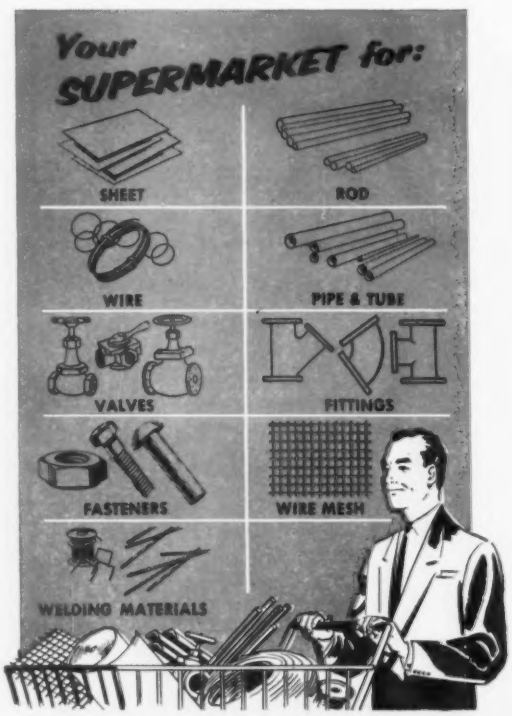

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INDUSTRY IS MAKING GOOD ON CAPITAL SPENDING plans. This week's announcements by Republic Steel Corp. and Youngstown Sheet & Tube point out the steel industry is well on its way to fulfilling its capital spending goals. Earlier, the industry set a goal of $1.6 billion this year for new plants and equipment. It looks like it will reach it.

BUT SPENDING FOR NEW PLANT AND EQUIPMENT is not in the direction of adding physical volume. Instead, most of the spending will be for equipment to improve efficiency and cut costs. While the steel industry is only one segment, its intention to improve, rather than add to, facilities is an important part of the trend.

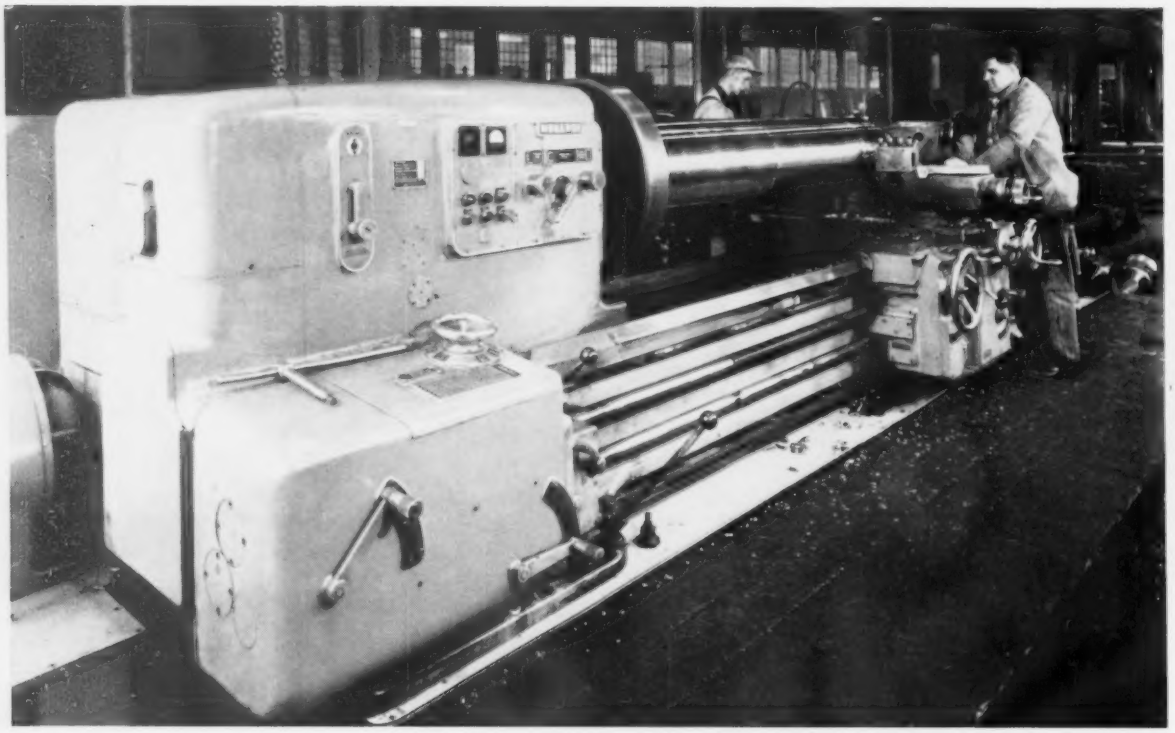
U. S. AUTOMAKERS HOLD OUT LITTLE HOPE of regaining a fat export market. They deny it's because of little interest in U. S. autos abroad. Instead, they point to discriminatory practices in duty, taxes, and shipping rates. W. H. Thoreson, director of automotive export for American Motors, points out: Not only are duties and taxes at prohibitive levels, but shipping charges from the U. S. to Europe are double those of the same car coming this way.

TOOL AND DIEMAKERS EXPECT GOOD BUSINESS through 1960. This is the opinion of the trustees of the National Tool & Die Manufacturers Assn. This industry, a reliable barometer of metalworking, expressed this favorable outlook at the annual winter meeting. Industries most active in tool and die ordering are defense, automotive, appliance, electronics, and business machines. Tooling for conventional aircraft is in sharp decline.

THE INDEX OF THE AMERICAN GEAR MANUFACTURERS ASSN. shows a 4.1 pct increase in January over December. The January index was 243.4 (1947-49=100) for new bookings. This is above the 1959 average of 234.7. The index of shipments dropped in January, however, from 250.2 in December to 207.3 in the first month of this year.

SOME OTHER RANDOM INDICATORS: Net new orders of $6,827,000 for industrial equipment in January were up 50 pct from the same month a year ago, according to the Industrial Heating Equipment Assn. New orders for industrial supplies and machinery in January were down 2 pct from December, according to the index of the American Supply & Machinery Manufacturers' Assn.

"Dyna-Shift" lathe ups output 25%, tool life 50%, —30 Timken® bearings maintain rigidity, accuracy



YOU merely set the controls of the Dyna-Shift drive on this Monarch Series 90 lathe to get the correct speed automatically. What's more, the "90" can be kept under full load at any speed, using modern tooling. Results, reports Monarch, show up to 25% more output and 50% greater tool life than with other equipment. Thirty Timken® tapered roller bearings at vital points—spindle, gear box, apron and tailstock—assure constant rigidity and accuracy, for maximum economy.

Most American machine tool builders use Timken bearings. Two big reasons are: 1) The taper lets Timken bearings take *both* radial and thrust loads or any combination. 2) Precision manufacture of Timken bearings assures high precision in the machine.

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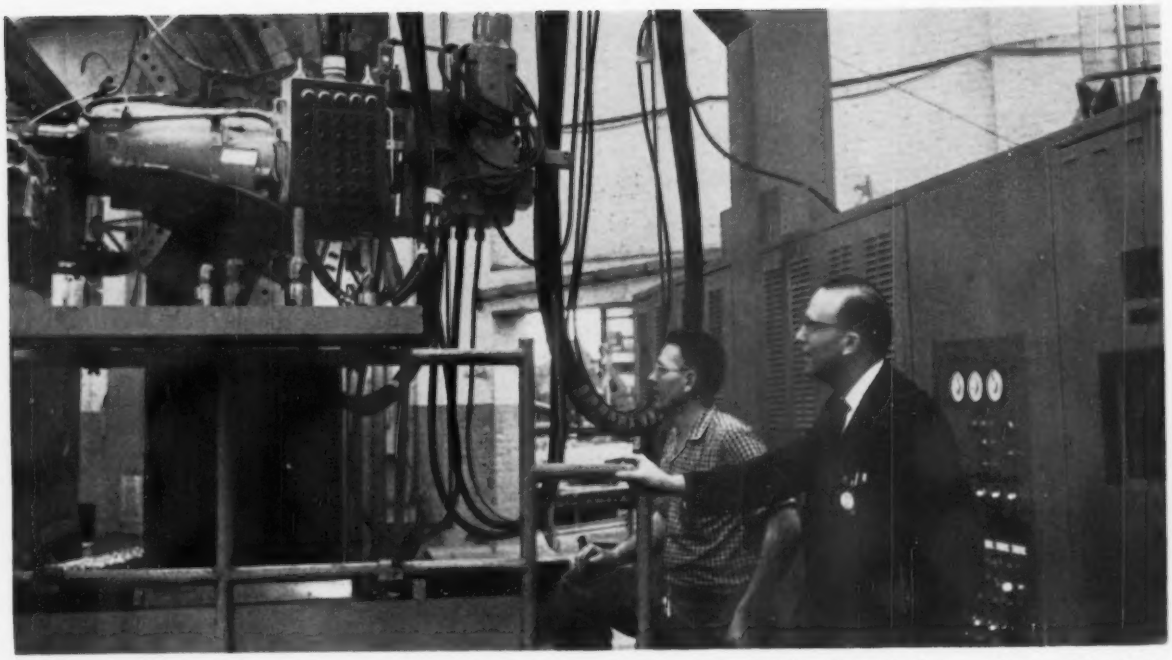
The Timken Roller Bearing Company, Canton 6, Ohio. Cable: "TIMROSCO". *Makers of Tapered Roller Bearings, Fine Alloy Steel and Removable Rock Bits.*



CHECK OUT: Tape-controlled tool is put through its paces for J. J. Childs, right, chairman of Republic Aviation's numerical control program. Machine is performing a simultaneous five-motion cut.

Numerical Controls Take Hold

Make Steady Gains in Metal-Cutting Field

Numerical controls have captured the imagination of manufacturing management.

Ever-widening uses will boost sales of numerically-controlled tools.—By E. C. Beaudet.

■ "We expect the machine tool industry to sell $15-25 million worth of numerically-controlled machine tools in 1960, about $50 million in 1961, and $75-100 million in 1962."

This forecast by Francis J. Trecker, president of Kearney & Trecker Corp., Milwaukee, reflects the optimism shared by many others about the growing future for numerical controls.

There seems to be good reason for this optimism.

Use Spreads—Until now, numerical control of machining operations has been considered largly an infant of the aerospace industry. But today numerical control is spreading throughout industry to applications far removed from the milling of aerospace parts.

"In the late 1920's the big thing was hydraulics; in the late 1930's electrical controls; today it's numerical control," says Myron S. Curtis, Warner & Swasey's vice president of engineering.

As chairman of the numerical controls committee of the National Machine Tool Builders' Assn., he's in a good position to know.

Mr. Curtis reports the uses of numerical controls will probably arouse more interest than any other single field of development and design at the Machine Tool Exposition in Chicago this fall.

Big Array—In sharp contrast to the 1955 Exposition, when only a few experimental units were shown, dozens of examples of numerical controls will be in operation.

Numerically controlled jig borers, presses, boring mills, turret lathes, milling machines, grinders, and possibly some of the big "elephants," such as skin mills, will go through their paces at the September Exposition.

But how do things stand in the industry which first put numerical

controls to widespread use?

"While much of the old glamour still surrounds these machines, most of the mystery is gone," muses O. D. Smith, Senior Computing Engineer for North American Aviation, Inc.

"Management," he says, "has become well-enough informed to think in terms of binary bits, tape transport, part programming and all the jargon of numerical control."

Stage Set—This experience piled up by machine tool builders and control makers, working with aerospace companies, will come in handy as they push out the frontiers for numerical control applications.

For the potential user, whether or not to get into numerically controlled cutting operations depends on the answers to three basic questions: Is numerical control applicable to operations in my plant? Will it justify the cost? If so, what kind of numerically-controlled machines are best suited for my needs?

Basic Types—The data for numerically-controlled metal cutting can be transmitted by punched cards or tape. Of the two types of numerical control — point-to-point and path control — point-to-point promises wider application in metalworking.

FRANCIS J. TRECKER: Sees upswing in tape-controlled tool sales.

It is easily adaptable to machining where the start and stop positions of the tool can be controlled by the tape (or cards), and the operation of the tool between the two points is controlled by some other method. Main uses are for drilling, boring and reaming.

Complex Shapes—Path or contouring control is more complex because it involves a combined movement of the slides while cutting is done. So far, it has been used for the machining of complex shapes, and mostly limited to turning and milling operations.

Regardless of the method, numerical control has definite advantages for many machining operations.

User Benefit—It eliminates operator control, and along with this the chance for human error. Lead time and setup time is shorter. Tool loading is always correct. It cuts down inventories of jigs, tools and templates. Control data can be changed easily and stored for use when needed.

But if a numerical control program is to be successful, considerable advance planning is necessary.

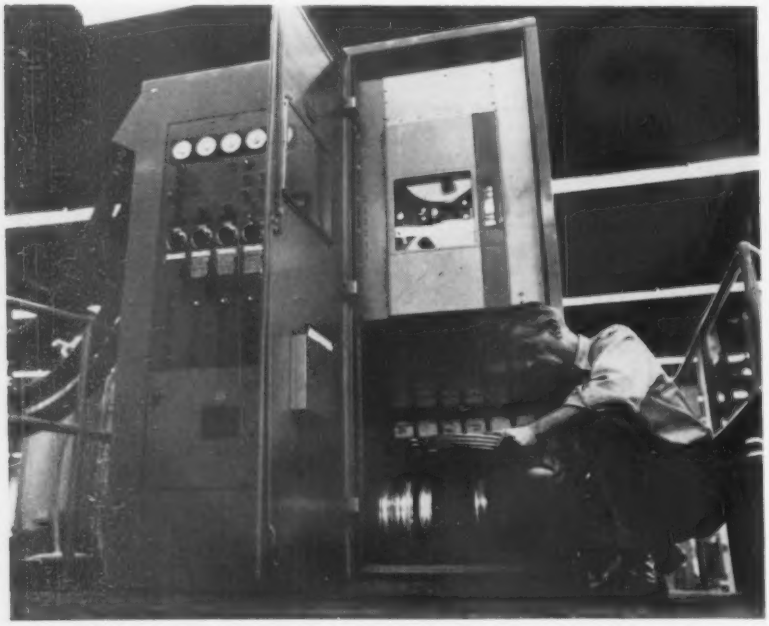
Republic Aviation Corp., Farmingdale, N. Y., is a good example. The company presently operates five numerically-controlled milling machines, costing over $2 million, on a full-time production basis.

Need Program—At the outset in 1956, it soon became apparent that a formal program was a necessity. Accordingly, a program to coordinate the various talents needed into a single effort was outlined to Republic's management and approved.

Mathematicians with Ph.D.'s had to develop computer techniques so that tape preparation costs could be kept low. At the same time engineers were busy developing more stringent manufacturing methods since "adjustments" could not be made on the shop floor.

Set Target—The main objective of the numerical control group was to be ready with tapes, holding fixtures, cutters and material when the machines were ready for operation. Idle machines, even numerically controlled ones, don't pay off.

This formal program, under the chairmanship of James J. Childs, started underway a full year before production. And at least six months before that were spent in serious study of the feasibility of numerical



STORE DATA: Big benefit in tape control is in storing machining data for future use. Here Republic operator checks tape inventory.

controls for the plant.

Check Maintenance—In addition to sound planning, maintenance is an important factor in numerical controls. Though not revolutionary, Mr. Childs feels a somewhat novel approach to the maintenance problem is necessary.

"No matter what's done behind the scenes in numerical control, if the machines are not operating and cutting chips, you're not making money," he says.

"The relative importance of electronics has increased substantially. This has been complemented, perhaps to a lesser degree, by increased mechanical complexity. The roll of the maintenance department is growing.

"Indeed, the eventual outcome may result in a heavy reduction of direct manpower and almost total dependence on maintenance operations. This, of course," he reports, "is not expected for some time."

The Payoff—Planned preventive maintenance has paid off for Republic. On most of its numerically-controlled machines, no outside assistance from the equipment supplier has been asked in the past year and a half. On the rest, only one call was needed a year ago.

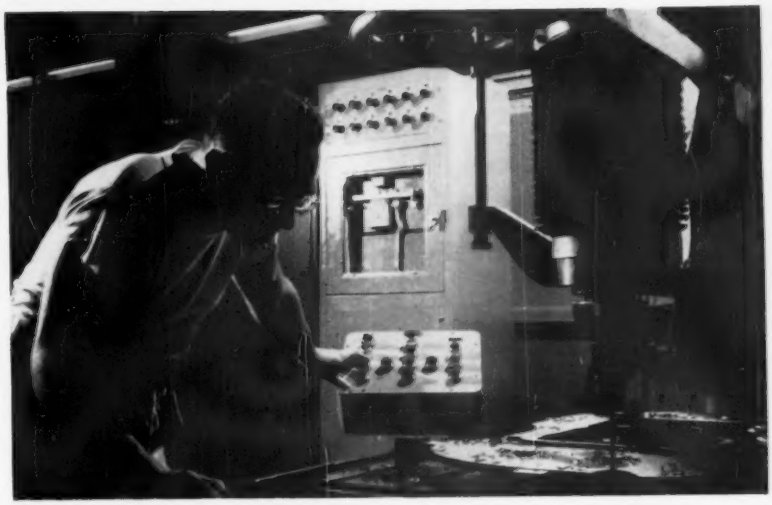
While contouring equipment like that at Republic has seen its greatest use in the aerospace industry, lower cost, less complicated point-to-point systems stand the best chance for catching on quickly throughout broader areas of metalworking.

"We believe that customer dollar outlays will be about equally divided between three-dimensional and two-dimensional numerically-controlled equipment," reports Mr. Trecker.

"Of course, I'm referring to dollar volume. From a unit standpoint, it's probable that three times as many two-dimensionally controlled machine tools will be sold as the more expensive three-dimensionally controlled units."

Not For Mass Output—Just how soon numerical controls will be used in high-volume production is very hard to see at this time. Here, repetitive output justifies the use of single-purpose machines.

But, according to Mr. Curtis, numerical control will find steadily broader application throughout the general metalworking field, because of its complete control over machine operations, its versatility, and its capacity to store information.



BIG SAVINGS: Sperry Gyroscope reports savings of $67,000 yearly by using tape controls on this six-spindle drill press.

3-D CUT: Depth control on this new tape-controlled jig borer cuts manufacturing time at Lockheed's Missile and Space Div. by 50 pct.

As far as the aerospace industry is concerned, the big question regarding numerical controls, says North American's Smith, is where do they go from here.

New Uses—As he sees it, there may be a big payoff in the use of numerical controls in welding, grinding, tube benders, inspection machines and other devices.

Autos Enter Critical Period

First Quarter Sales Hopes Didn't Pan Out

Spring sales must "explode" if industry sales this year are to equal the 6.5 million unit forecast.

Sales gains over 1959 have not been enough to support high production levels. And the automakers are cutting back.—By A. E. Fleming.

▪ The bloom is off the auto boom. U. S. automakers had hoped the first quarter would be the best in history. But it's falling short of expectations.

However, there's still talk of an excellent year, even though hopes of records are vanishing. The only thing wrong is that the new car market in early 1960 was overappraised. And this is always disenchanting.

Realism Rules—Car output may fall 300,000 to 400,000 units below the original January-March target of 2.25 million. Production schedules were juggled daily in February. They will be juggled this month. Panic isn't creeping into the market. But realism, based on 60 days of rather disappointing sales reports, has taken hold.

Three months ago it was felt 750,000 persons who were not able to buy new cars in October-December would flock to the showrooms in early 1960.

To this auto makers added hundreds of thousands of customers generally expected to buy new cars in the first quarter of a 6.5 to 7 million car year. And finally, they added the number of cars needed to replenish dwindling dealer inventories.

Revising Downward—The total came to 2.25 million cars made up of 700,000 in January, 750,000 in February and 800,000 in March. This would have made March the best month ever (see chart).

But it isn't happening that way. January was a few strokes off par at 688,700. But the crack in the market really widened in February. As the month began, the production goal was narrowed from 750,000 to 725,000. Then some companies cut overtime and the estimate fell to 700,000. The final February total was 659,300 or 90,700 under the original schedule. It was evident people who seemed interested in cars when they couldn't get them in the fall, had lost interest by the time winter set in.

The March outlook is uncertain, too. At the turn of the year, the March projection had been lowered from 800,000 to 750,000. In mid-February it was lowered again to 725,000. Now sights have been really lowered—to 575,000. This is about the same as last year and 275,000 below the original schedule.

Still Hopeful—But the industry would like to think it looks bad only in view of "what might have been." Industry officials say things are shaping up for a 1.9 million production quarter. This is second only to the 2.1 million total of 1955's record year. The 1959 count was 1.6 million.

Auto executives are sticking to

Auto Output Tapers Off

their estimates of 6.5 million domestic car sales in 1960. But they realize sales have got to get going pretty soon. L. L. Colbert, Chrysler Corp. president, says despite a spongy market at present, he is still looking for 6.5 million sales. He says sales will have to explode this spring, but he believes all the factors are present for a big upswing.

Dealer Stocks High—However, because sales didn't keep pace with production in January and February, new car inventories climbed menacingly. From 575,000 cars in dealer showrooms at the beginning of the year, the total mushroomed to a current figure of around 1 million, highest in history. The former high of 965,000 was set at the end of last July.

But optimism isn't dead. Composite industry new car sales are running roughly 10 pct ahead of last year. American Motors and Chrysler Corp. are the biggest gainers.

Compact cars are selling well, taking 20 to 25 pct of the market. But they are digging into sales of standard model Chevrolets, Plymouths and Fords.

Who's Doing What—At the start of March, 1960 model production reached the 3 million point, far ahead of last year's pace. Standard Fords and Chevrolets were running neck and neck at around 550,000 units. Compact totals were 220,000 for Rambler, 185,000 for Falcon, 145,000-Corvair, 80,000-Lark, 60,-000-Valiant and 2000-Comet. Production on the Comet started in mid-February.

But nominal sales gains over last year are not enough to keep auto plants bustling in high gear. As March got underway steps were taken to slow down.

More Cutbacks?—Auto production, which hit a weekly 1960 peak of 175,000 cars in mid-January, fell to the 150,000-160,000 level in February and early March.

There are rumblings of 110,-000-120,000 weekly counts by mid-March. This may or may not happen, but signs indicate it will.

Steel Spending Gains Momentum

Republic Steel Corp. and Youngstown Sheet & Tube Co., reveal multi-million dollar capital spending programs.

This is only a part of the $1.6 billion steel firms will spend in 1960.

▪ The steel industry is apparently living up to its prediction that it will spend $1.6 billion for new plants and equipment in 1960 (IRON AGE, Mar. 3, 1960, P. 56). Emphasis is on improving efficiency, rather than boosting output.

Republic Steel Corp. reports its capital expenditures this year will reach a record of over $159 million. The spending is part of a five-year plan to improve efficiency. At the same time, Youngstown Sheet & Tube Co. says it will spend $85 million in 1960.

Last week two leading iron ore producers—M. A. Hanna Co. and Oliver Iron Mining Div., U. S. Steel Corp.—each announced plans for Minnesota pilot plants to test processing of semi-taconite into usable blast furnace charge.

What's Coming—The main Republic projects programmed but not previously reported include: Installation of hot strip finishing facilities and a 48-in. continuous heavy gage strip galvanizing line at the company's Warren plant. An additional battery of coke ovens and a plastic coating line for steel pipe are slated for its Youngstown plant.

Also: Relocation and rehabilitation of the 8-in. bar mill at the Canton plant is planned. The Buffalo plant will get additional soaking pits. Special heat treating facilities will be installed at the Chicago plant. And a new battery of coke ovens and coal chemical producing facilities, plus additional soaking pits are planned for the Gadsden, Ala., plant.

To Cut Costs — Youngstown's $85 million outlay will be aimed chiefly at relieving bottlenecks in finishing facilities and at cutting production costs.

Company officials say Youngstown spent $75 million last year on capital additions and improvements. It entered 1960 with $135 million appropriated for other projects not yet finished.

A spokesman said about $85 million of this will be spent in 1960, with the remainder being carried over into 1961.

Adds Galvanized—J. L. Mauthe, company chairman, said the firm's ingot capacity—currently rated at 6,750,000 tons a year—will be increased moderately with continuing application of new techniques.

Major projects include: Rebuilding of a 79 in.-hot strip mill at the Campbell, O., works; building of a second continuous annealing line to produce canmaking tinplate at the Indiana Harbor works, and addition of a galvanizing line at Indiana Harbor. The latter will put the company into the galvanized steel business for the first time.

Ore Projects — In the taconite projects, M. A. Hanna Co. will build a pilot plant costing nearly $2 million near Cooley, Minn. Oliver Iron Mining Div., U. S. Steel Corp., will construct a similar pilot plant at Coleraine, Minn.

Both plants will be in the western portion of the Mesabi iron range. And both will experiment with roasting processes to change the low-grade taconite chemically into a magnetic form. The semi-taconite is non-magnetic and cannot now be concentrated by the same processes used for taconite.

How An Accountant Views Tax Proposals

▪ Full bipartisan support for broad depreciation reform at this session of Congress was urged by Maurice E. Peloubet, New York accountant. He suggests allowances be increased by as much as $7 billion a year "to meet the crisis created by obsolescent industrial equipment and foreign equipment."

Mr. Peloubet believes such a move "would go a long way toward eliminating the enormous backlog of something in the neighborhood of $90 billion of obsolete machinery which is now weighing down American industry."

Europe and Japan, he points out, not only have lower labor costs, but they don't have "a great mass of obsolete equipment," either.

Commenting on the bills before the Committee, Mr. Peloubet believes they should be passed—if "properly amended." However, he cautions, "If it is decided to move along these lines, the test of the Treasury's program of administrative improvement of the depreciation deduction should be as limited in time as possible."

His reasons for a time limit: "If it is successful, everyone will be pleased. And there may be no necessity to advocate legislation on the question of rates and useful lives. In this event, we have only to consider questions arising from inflation."

And if the program proves ineffective, "We will have additional support for legislation to cover the field of rates and useful lives as well."

Depreciation Hearings Underway

Business groups charge Administration proposals are a piecemeal approach to the problems.

They ask for a sweeping liberalization of the tax depreciation rules.—By R. W. Crosby.

▪ Business groups appeared in Washington at hearings on President Eisenhower's plans for depreciation reform. They commended the Administration for the move, then proceeded to tear the plans apart.

The groups appeared before the House Ways and Means Committee to discuss bills embodying the President's plans. But they labeled the proposed legislation "a piecemeal, patchwork approach" to the depreciation problem.

The bills were drafted by the Treasury Department and introduced at its request as H.R. 10491 and 10492.

What Treasury Wants — Under the proposals profits from the sale of depreciable, tangible, personal property would be taxed as ordinary income, instead of capital gains, to the extent of the depreciation previously claimed.

This would mean profits on depreciable property would be taxed at a 52 pct rate rather than the present 25 pct rate. The one exception would be if the equipment sold for more than it cost originally. The gain over the original price still would be taxed at the 25 pct rate.

Fred C. Scribner, Jr., Under Secretary of the Treasury, told the committee that present tax rules allow a loophole which businessmen use to reduce the tax rate on profits from the sale of depreciated equipment and machinery.

Plug the Loophole—Mr. Scribner says Congress should close the loophole. Then the Treasury Dept. would tell its tax agents to be less tight-fisted in allowing business write-offs for depreciation.

But business groups contend that isn't enough. They insist on a sweeping liberalization of tax depreciation rules.

But Mr. Scribner argues the proposed revision is a long-range proposition. And he claims it would recoup $125 million a year in revenues now escaping.

But Joel Barlow, chairman of the U. S. Chamber of Commerce tax committee, urges rejection of the bill unless it is coupled with sweeping "reform" of depreciation rules.

Five Suggestions — Mr. Barlow made five specific recommendations:

Overall revision of the tax depreciation system is needed. Eliminate controversies over depreciable lives and salvage value. Encourage taxpayers to use shorter and more realistic depreciable lives.

Broaden revision so that a restriction on capital gains will not bring abuse.

Eliminate the $10,000 limitation in the rules.

Formulate a specific program before considering the present proposal.

If the "restrictive treatment" of H.R. 10491 and 10492 is to be adopted as a preliminary to other depreciation legislation, then it should be limited temporarily to tangible personal property having a depreciable life of five years or less. This would prevent taxation of phantom profits.

No Letup in Sight in Labor Strife

Mediation Director Sees Issues and Tensions Continuing

Federal Mediators struggled through a 35 pct increase in caseload in 1959.

Job security on the union side runs up against drive for greater efficiency on management's part.

■ The Federal Mediation and Conciliation Service is just digging itself out of a 35 pct increase in caseloads in 1959 over 1958.

And its strike and strife-buffeted director, Joseph F. Finnegan, holds out little hope of any improvement this year.

"All indications point to continuing or worsening complexities in bargaining," he says in looking ahead to this year.

Tougher Stands — "The end of fiscal year 1959 saw the beginnings of hardening positions by the parties on matters other than wage issues.

"The Service anticipates that fiscal year 1960 will see an extension of some of the issues that came to the fore this year and will offer a serious challenge to the parties and to Service personnel," is the conclusion.

Steel Strike Reflected?—The statistical report of the Federal Mediation and Conciliation Service covers only fiscal 1959. But Mr. Finnegan's comments on the issues and causes of labor strife have a fresh sound.

They reflect, at least in part, his frustrations of the 1959 steel strike when he was thrust into the middle of that bitter battle.

Issues Carry Over—Mr. Finnegan does not feel that the labor-management strife of 1959 "will necessarily" carry over into 1960. But he points out that the issues and tensions will.

He says the labor-management front was marked by a stiffening of bargaining attitudes.

"Employers who in past years negotiated chiefly over 'how much?' were now putting emphasis on contract changes aimed at improving efficiency and reducing costs."

Unions reflected concern with job security, job protection, and job opportunity, along with the usual primary drive for more extensive economic benefits.

Looking back on fiscal 1959, the Service reports a 35 pct increase in mediation caseload. This was caused by the "wide range of issues which arose during the year and the tenacity with which these positions were held."

Issues and Industries — Among industries, manufacturing was by far the leader in cases closed by the Service during the year. A total of 69 pct of all cases involved manufacturing companies. Far behind were services, 9.1 pct; construction, 7.8 pct; wholesale trade, 5.7 pct.

Among the issues, wages still led. This issue occurred almost twice as frequently as the next most frequent, duration of contract.

More significant, however, are the per cent increases of some other issues. For example, while the increase in wages as an issue was 22.9 pct (1959 over 1958) arbitration and grievance procedure increased 105.7 pct. Seniority increased 42.9 pct in frequency and guarantees 53.3 pct. Management prerogatives increased 33.1 pct.

BUFFETED BUT UNBOWED: Few labor authorities have ever been through J. F. Finnegan's "man in the middle" experiences in the recent steel negotiations. Here, he reports on his Service's overall picture.

SATELLITE: Streamlined piece of office furniture designed by Kaiser Aluminum's industrial design dept.

Tailor Designs to New Markets

A good way to expand markets is to show customers how they can make their product more attractive.

An aluminum company has a staff of designers working up ideas to interest users. — By F. J. Starin.

▪ Aluminum salesman Frank Hershey doesn't work with the usual price books or sample kits. His tools: India ink and a drawing board —and the sketches he makes using them.

Mr. Hershey heads the industrial design dept. of Kaiser Aluminum & Chemical Co.

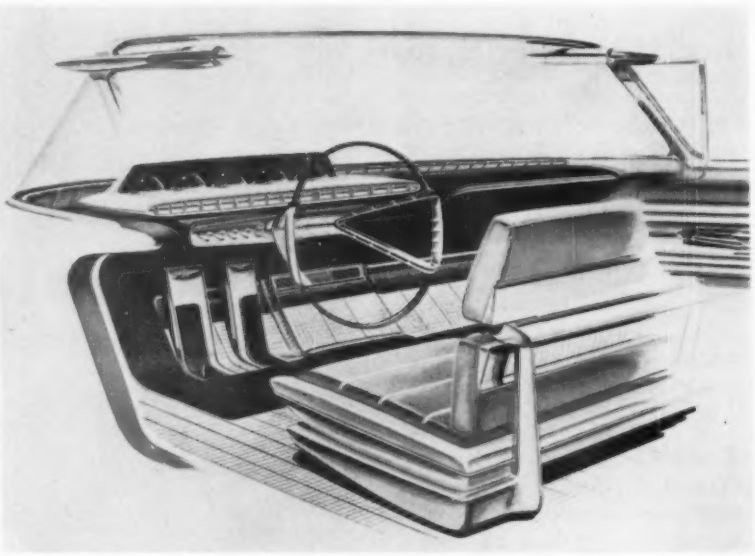
Design is now being recognized as a vital plank in aluminum's campaign to widen its markets. In some cases it is valuable in just holding onto markets. All three major U. S. producers now have design depts.

Design Groups—At Kaiser, for instance, the design group was set up four years ago with two men. Now there are six designers—and more projects than they have time.

Coordination between designers, sales, and technical people has improved. Now, all sketches from Kaiser drawing boards are complete with data on proper alloy, joining techniques, and fabrication methods based on the type of equipment fabricators are likely to have, and best mill shapes for specific uses.

Also, sales people usually define the commerical possibilities before a designer sets pen to paper.

Aid Customers—Kaiser designers, in addition to coming up with



SUGGESTION: The ultra-modern automobile interior is a suggestion from Kaiser Aluminum designers. Aluminum casting integrates firewall, toeboard, and panel parts; the seat frame is an aluminum forging.

futuristic designs for wide distribution as suggestions for fabricators' designers, will also consult with customers on design. Or, says Mr. Hershey, they will completely redesign any line of products for a customer, when commerically feasible.

To date, Kaiser designers have ventured into automobiles, appliances, office furniture and boats. "Each market is vastly different from any other," says Kaiser's design chief. "In automobiles, for instance, each automaker is well staffed with top notch people. Our best approach was to put togther a collection of ultra-modern sketches and just present a set to each designer," he explains.

"There's no real way we can know how well we've done because designers naturally adapt our ideas to their own thinking and needs. However, in one case," says Mr. Hershey, "a major automaker asked for suggestions for an aluminum grille. They used one of our designs as is."

The Hull Problem—Boats are an area where the value of design is most noticeable. Aluminum, which once moved in on wood, is now being severely crowded by plastics. In fact, the market picture started looking so serious that the three big producers—Aluminum Co. of America, Reynolds Metals Co., and Kaiser— formed a committee to go after this market in unison.

Mr. Hershey admits that plastics can be more easily formed than aluminum. And, he says, design of plastic boats have been generally better than aluminum. But he insists that more imaginative aluminum designers are now starting to cope with both problems.

For instance, a flared hull, one of the most popular types, can easily be molded in plastic. But aluminum must be strech formed, and few aluminum boat builders have the equipment.

A Boat Is a Boat—Mr. Hershey designed a wrapped aluminum sheet hull, easily made with standard equipment. It isn't flared, but gives the impression it is.

Missiles Boost Vacuum Melting

Missile programs demand bigger and bigger ingots of vacuum melted steel, touching-off another expansion wave. — By G. J. McManus.

■ A hard shove from the missile program seems to have turned loose a new stage for vacuum melting.

To meet military and other needs, producers are going to bigger furnaces and bigger ingots. The swing is broad-based; it is moving in long steps.

Until recently, a 10-ton ingot with 20-in. diameter was considered big for vacuum melting. In January, Midvale-Heppenstall Co. revealed plans for a consumable electrode furnace that would make 25 ton ingots, 40 in. across.

Bigger Ingots—Last month Allegheny Ludlum Steel Corp. unbuttoned a project calling for a consumable electrode furnace to make 50-in. ingots with at least twice the weight of anything commercially available.

More are coming. Universal-Cyclops Steel Corp. has plans for a furnace in the 40-in.-or-better range. Crucible Steel Co. of America is considering a giant unit for the near future. Latrobe Steel Co. has plans for a larger furnace, although it is not now thinking in terms of the big 40-in. ingots.

United States Steel Corp. has gotten into some commercial production with its 32-in. furnace at Chicago. The unit, is designed for enlargement to 44-in. ingot size. In addition, there are a dozen or so companies studying furnaces in the 20 to 30 in. range.

Opening Markets—In part, the new projects aim at opening up general markets by providing a greater assortment of vacuum melted steels. Midvale-Heppenstall says the main purpose of its new furnace is to supply better forgings for a wide range of applications.

Other producers voice similar views. "The new furnace . . . should also lead to expanded civilian markets for vacuum-melted materials," says Clark W. King, executive vice president, Allegheny Ludlum.

But among the specialty steel producers, military applications seem to be providing the immediate push for larger furnaces. Missile makers want to get away from welds and joints in motor cases. They are going from sheets or plates to some type of forged casing.

Seamless Casings — "The trend in missile work is toward seamless, integral construction of rocket case bodies and heads," says Dr. G. K. Baht of Mellon Institute. Dr. Baht has been closely associated with the Navy's missile program.

One-piece casings must start with large chunks of steel. For the motor case of the Minuteman missile, a 30-in. ingot is cast from a consumable electrode furnace. This is about the size limit with existing equipment.

The ingot is cogged down to a 19½-in. billet. The billet is forged to a sleeve 5 ft across. The sleeve is finished down to .060-.070 in. wall thickness by hydro spinning or some other means.

Reduction Ratio—In all these steps, ingot size restricts designers and fabricators. Higher strength levels will reduce ductility of the steel. This increases the need for sound, uniform metal.

Missile sizes being discussed for space travel go far beyond the dimensions of military missiles. Bigger ingots are a must as missiles get bigger.

It's Not the Name That Counts

WITHOUT A NAME: The unique apparatus above doesn't have a name, but its valuable. It was designed and built at Batelle Memorial Institute to study mechanical properties of refractory metals, graphites and ceramics at up to 4000 F. And with minor modifications it will operate at higher temperatures. It is being used to obtain such information as tensile and compressive stress-strain curves and shear and bearing strengths of specimens.

Output and Orders Off, Purchasers Report

Business is good, say the nation's purchasing agents, but the boom expected to launch the "sizzling sixties" hasn't yet materialized.

Buyers answering the latest business survey of the National Assn. of Purchasing Agents list February sales and production figures as less than January levels.

But more PA's report improvement than those who indicate a poorer position. Output was up in February, say 24 pct. No change is reported by 63 pct, with 13 pct listing a reduction.

Buying Caution—Bookings were improved over January, according to 28 pct. Forty-seven pct say new orders are coming in at the same rate. And 25 pct describe new business as "not as good."

Inventory caution has taken hold among the buyers. The majority maintain they will not add to purchased material stocks in the months ahead.

Higher inventories are reported by 34 pct questioned. Fifty pct say there was no change from January to February. Sixteen pct say stocks were slightly reduced.

Few Price Changes—Prices are showing little movement, the PA's say. Except for special situations, there's little change either up or down.

Tight money isn't having much effect on capital spending projects, the buyers assert. Only 9 pct say high money costs have caused them to postpone borrowing. In contrast, 91 pct report high interest rates have no effect on their plans.

There was one change in the buying pattern last month. Forward commitments for production items slowed down. And buyers showed more reluctance to build stocks of maintenance, repair and operating supplies. The most logical reason of both trends: The ready availability of most items.

Small Contractors To Get Paid Faster

Small defense contractors soon will receive work in progress payments just as large defense contractors do now.

Sen. Leverett Saltonstall, R., Mass., said his Senate Small Business Committee found that subcontractors had to wait until the work was done before getting paid. But large contractors, Saltonstall said, could get payments while work was going on.

The senator said he has been told by Perkins McGuire, Assistant Secretary of Defense for Supply and Logistics, that a new regulation is being drafted.

There are some 100,000 subcontractors in the nation who will benefit, Saltonstall said.

Wage Competition

Congress is eyeing legislation to offset low wage advantages foreign competitors have over American industry.

Sen. Keating, R., N. Y., sponsor of the Fair Labor Standards Trade Act of 1960, says foreign wage competition has become increasingly difficult to meet in such industries as kitchen utensils, hand tools, small appliances, toys, bicycles and plumbing fixtures.

The bill provides the President could raise tariff duties as much as 100 pct if it was found foreign wage competition is injuring domestic industries.

The action could be taken only after an investigation by the Secretary of Labor. Such an investigation could be initiated by the President, either House of Congress, an industry or an employee organization.

Steel District Capacities Revised

American Iron & Steel Institute Issues District Rates

Steel operating rates by districts will now be released by the AISI.

The service, pioneered by The IRON AGE, results in revised district boundaries.

The new districts, and other production and capacity details, are included in this fold-out.

■ For some 40 years The IRON AGE has been compiling and publishing the operating rates of steel mills by districts. This service was pioneered by The IRON AGE as a business barometer. It was made possible through the cooperation of every major steel company in the United States.

Last week the American Iron and Steel Institute began to issue district operating rates. Hence, operating rates by districts (see p. 169) will in future be American Iron and Steel Institute data.

Now 11 Areas—Working with its statistical and commercial research committees, the Institute has divided the United States into 11 districts for these weekly reports. Since The IRON AGE has been reporting these figures for 13 districts (The IRON AGE, Jan. 28, pp 53-60), a new set of tables is needed to show the makeup of each district. The 11-district tables are on the reverse side of this sheet.

Any division of the country's steelmaking capacity has to be somewhat arbitrary. In the past, for instance, the editors of The IRON AGE have come under fire from newspapers and chambers of commerce in various areas. The complaints were that the area in question either was not separate or was not included—depending upon the local viewpoint.

Revolt in Pittsburgh—One of the sharpest criticisms came from Pittsburgh because Weirton and Wheeling were reported separately as part of the "Upper Ohio River" district. Without this capacity, Chicago pulled ahead of Pittsburgh in rated tonnage. And vice-versa, it caused some chest-thumping in Chicagoland.

Weirton and Wheeling plants will now be reported in the Pittsburgh district under the American Iron and Steel Institute district setup. Thus Pittsburgh again becomes the nation's No. 1 district, with 21.5 pct of the total U. S. rated capacity.

Operating rates of individual plants are rarely disclosed, and never without permission. For this reason, a "district" must include at least three companies to keep any one company from knowing exactly what the other is doing.

Who Uses Data?—District operating rates are useful to the sales managers of many different industries. Consumption of scrap, ferroalloys, refractories, and other steelmaking raw materials is roughly gauged by watching district activity.

Railroads use the data in traffic planning. Local business men and industrialists find it a useful guide. For long-range planning, they show shifts in capacity on a regional basis. When the nation's total capacity is rising, sharp differences in this trend can not be overlooked by regional planners.

Planners and Purchasers—Industries considering new plant locations watch such figures. When steel is hard to get, purchasing people want to see how their suppliers are expanding, often wonder if they are getting their share of added capacity.

OFFICIAL DISTRICT CAPACITIES, 1959-1960

District	Rated Capacity—Net Tons		Pct of U. S. Capacity		Increase, 1959 to 1960	
	1960	1959	1960	1959	Net Tons	Pct
North East Coast	20,724,880	20,689,320	13.9	14.0	35,560	0.2
Buffalo	7,652,710	7,656,920	5.1	5.2	−4,210	
Pittsburgh	31,870,890	31,369,610	21.5	21.2	501,280	1.6
Youngstown	15,384,200	15,498,000	10.4	10.5	−113,800	−0.7
Cleveland	8,113,000	8,083,000	5.5	5.5	30,000	.....
Detroit	7,984,000	7,941,600	5.4	5.4	42,400	.....
Chicago	29,567,960	29,288,460	19.9	19.8	279,440	1.0
Cincinnati	5,667,790	6,001,790	3.8	4.1	−334,000	−5.6
St. Louis	3,480,000	3,223,000	2.3	2.2	257,000	8.0
Southern	8,619,100	8,488,470	5.8	5.7	130,630	0.2
Western	9,506,500	9,393,500	6.4	6.4	113,000	0.1
Total U. S.	148,570,970	147,633,670	100.0	100.0	937,300	0.6

←Lift page for details on plant and district capacities

Turn here for weekly district rates, 1959-1960→

Official Steel Ingot Co

CHICAGO

CITY	COMPANY	Rated Annual Capacity—Net Tons 1960	1959	1958
Chicago	Borg-Warner Corp.	.....	.....	100,000
Chicago	Acme Steel Co.	452,000	451,760	.....
Chicago	A. Finkl & Sons	33,600	33,600	33,600
Chicago	International Harvester Co.	1,200,000	1,200,000	1,200,000
Chicago	Republic Steel Corp.	1,769,000	1,769,000	1,697,000
Chicago	U. S. Steel Corp.	5,589,000	5,589,000	5,441,000
Chicago Hts.	Borg-Warner Corp.	117,500	.....	.....
Chicago Hts.	Columbia Tool Steel Co.	6,600	6,600	6,600
Lemont	Ceco Steel Corp.	150,000	.....	.....
Morton Grove	H. M. Harper Co.	11,700	.....	.....
Sterling	Northwestern Steel & Wire Co.	825,000	825,000	825,000
E. Chicago	Inland Steel Co.	6,500,000	6,500,000	5,800,000
E. Chicago	Youngstown Sheet & Tube Co.	3,420,000	3,420,000	3,280,000
Gary	U. S. Steel Corp.	7,999,000	7,999,000	7,204,000
Kokomo	Continental Steel Corp.	420,000	420,000	420,000
Fort Wayne	Joslyn Mfg. & Supply Co.	37,500	37,500	37,500
New Castle	Borg-Warner Corp.	64,000	64,000	64,000
Duluth	U. S. Steel Corp.	973,000	973,000	973,000
	Total	29,567,900	29,288,460	27,081,700

PITTSBURGH

Johnstown	Bethlehem Steel Co.	2,400,000	2,400,000	2,400,000
Johnstown	U. S. Steel Corp.	25,000	25,000	25,000
Washington	Jessop Steel Co.	35,800	35,800	35,740
Donora	U. S. Steel Corp.	1,015,000	1,015,000	1,015,000
Braeburn	Braeburn Alloy Steel Corp.	20,730	20,730	20,730
Latrobe	Alco Products, Inc.	108,650	108,650	104,460
Latrobe	Latrobe Steel Co.	24,000	24,000	24,000
Latrobe	Vanadium-Alloys Steel Co.	12,000	12,000	12,000
Monessen	Pittsburgh Steel Co.	1,620,000	1,560,000	1,416,000
Aliquippa	Jones & Laughlin Steel Corp.	2,428,000	2,376,000	2,180,000
Aliquippa	H. K. Porter Co., Inc.	9,600	9,600	9,600
Ambridge	A. M. Byers Co.	90,000	90,000	90,000
Beaver Falls	Babcock & Wilcox Tube Co.	321,730	229,450	229,450
Midland	Crucible Steel Co.	1,364,000	1,362,000	1,356,000
Monaca	Vanadium-Alloys Steel Co.	30,000	30,000	30,000
Butler	Armco Steel Corp.	559,000	557,000	557,000
Duquesne	U. S. Steel Corp.	1,741,000	1,741,000	1,521,000
Braddock	U. S. Steel Corp.	2,529,000	2,529,000	2,179,000
McKeesport	U. S. Steel Corp.	1,392,000	1,392,000	1,446,000
Munhall	U. S. Steel Corp.	4,598,000	4,426,000	4,267,000
Clairton	U. S. Steel Corp.	1,064,000	1,064,000	1,064,000
Brackenridge	Allegheny Ludlum Steel Corp.	794,700	746,700	748,700
McKeesport	Firth Sterling, Inc.	20,040	20,040	20,040
Pittsburgh	Jones & Laughlin Steel Corp.	3,452,000	3,379,000	3,300,000
Pittsburgh	Heppenstall Steel Co.	55,550	55,550	55,550
Bridgeville	Universal-Cyclops Steel Co.	77,410	77,410	70,160
Carnegie	Union Electric Steel Corp.	25,000	25,000	25,000
W. Homestead	Mesta Machine Co.	105,000	105,000	105,000
Oakmont	Edgewater Steel Co.	117,600	117,600	117,600
Weirton	National Steel Corp.	3,300,000	3,300,000	3,300,000
Steubenville	Wheeling Steel Corp.	2,400,000	2,400,000	2,400,000
Toronto	Louis Berkman Co.	136,080	136,080	136,080
	Total	31,870,890	31,369,610	30,258,110

YOUNGSTOWN

CITY	COMPANY	Rated Annual Capacity—Net Tons 1960	1959	1958
New Castle	Mesta Machine Co.	66,000	66,000	66,000
Farrell	Sharon Steel Co.	1,370,000	1,268,000	1,396,000
Campbell	Youngstown Sheet & Tube Co.	1,800,000	1,800,000	1,772,000
Youngstown	Youngstown Sheet & Tube Co.	1,530,000	1,530,000	1,448,000
Youngstown	Republic Steel Corp.	2,129,000	2,129,000	2,053,000
Youngstown	U. S. Steel Corp.	2,712,000	2,923,000	2,943,000
Lowellville	Sharon Steel Co.	593,000	593,000	593,000
Warren	Copperweld Steel Co.	660,000	660,000	660,000
Warren	Republic Steel Corp.	1,520,000	1,520,000	1,408,000
Canton	Timken Roller Bearing Co.	700,000	700,000	700,000
Canton	Industrial Forge & Steel, Inc.	79,200	84,000	84,000
Canton	Republic Steel Corp.	1,045,000	1,045,000	1,025,000
Massillon	Republic Steel Corp.	680,000	680,000	620,000
Mansfield	Empire Steel Corp.	500,000	500,000	500,000
	Total	15,384,200	15,498,000	15,268,000

WESTERN

Pueblo	Colorado Fuel & Iron Corp.	1,800,000	1,800,000	1,800,000
Geneva	U. S. Steel Corp.	2,300,000	2,300,000	2,262,000
Helena, Ariz.	Western Rolling Mills Div.	60,000	60,000	.....
Seattle	Bethlehem Pacific Coast Steel Corp.	246,000	246,000	246,000
Seattle	Isaacson Iron Works	102,000	102,000	102,000
Seattle	N. W. Steel Rolling Mills	53,000	53,000	53,000
Portland	Oregon Steel Mills	150,000	150,000	150,000
San Francisco	Behtlehem Pacific Coast Steel Corp.	276,000	276,000	276,000
Emeryville	Judson Steel Co.	76,500	76,500	76,500
Niles, Calif.	Pacific State Steel Corp.	216,000	216,000	216,000
Pittsburg, Calif.	U. S. Steel Corp.	380,000	380,000	380,000
Los Angeles	Bethlehem Pacific Coast Steel Corp.	478,000	478,000	478,000
Los Angeles	S. W. Steel Rolling Mills	100,000	45,000	45,000
Torrance	U. S. Steel Corp.	237,000	228,000	228,000
Torrance	Armco Steel Corp.	50,000	50,000	50,200
Fontana	Kaiser Steel Corp.	2,933,000	2,933,000	1,536,000
	Total	9,506,500	9,393,500	7,898,700

BUFFALO

Cortland	Wickwire Bros., Inc.	28,730	32,440	32,250
Syracuse	Crucible Steel Co. of America	61,380	61,380	60,730
Lockport	Simonds Saw & Steel Co.	21,600	21,600	21,600
Buffalo	Republic Steel Corp.	900,000	900,000	882,000
Lackawanna	Bethlehem Steel Co.	6,000,000	6,000,000	6,000,000
Tonawanda	Colorado Fuel & Iron Corp.	295,000	295,000	295,000
Tonawanda	Allegheny Ludlum Steel Co.	4,000	4,500	4,500
Dunkirk	Allegheny Ludlum Steel Co.	33,000	33,000	33,000
Irvine	National Forge & Ordnance Co.	25,000	25,000	25,000
Erie	Erie Forge & Steel Co.	284,000	284,000	234,000
	Total	7,652,710	7,656,920	7,588,080

Capacities By Districts

Source: American Iron and Steel Institute

DETROIT

CITY	COMPANY	Rated Annual Capacity—Net Tons 1960	1959	1958
Dearborn	Ford Motor Co.	1,940,000	1,898,600	1,898,600
Ecorse	National Steel Corp.	3,700,000	3,700,000	3,500,000
Ferndale	Allegheny Ludlum Steel Corp.	4,000	3,000	3,000
Trenton	McLouth Steel Corp.	2,040,000	2,040,000	1,574,000
Warren	Jones & Laughlin Steel Corp.	300,000	300,000	200,000
	Total	7,984,000	7,941,600	7,175,600

CINCINNATI

CITY	COMPANY	Rated Annual Capacity—Net Tons 1960	1959	1958
Huntington	H. K. Porter Co., Inc.	117,000	110,000	84,000
Cincinnati	Amer. Compressed Steel Co.	21,600	21,600	21,600
Middletown	Armco Steel Co.	2,700,000	2,557,000	2,493,000
Portsmouth	Detroit Steel Co.	1,000,000	1,500,000	1,500,000
Ashland	Armco Steel Co.	1,038,000	1,022,000	984,000
Newport	Acme-Newport Steel Co.	608,000	608,000	608,000
Owensboro	Jessop Steel Co.	183,190	183,190	183,190
	Total	5,667,790	6,001,790	5,873,790

ST. LOUIS

CITY	COMPANY	Rated Annual Capacity—Net Tons 1960	1959	1958
Peoria	Keystone Steel & Wire Co.	600,000	475,000	450,000
Alton	Laclede Steel Co.	600,000	600,000	600,000
Granite City	Granite City Steel Co.	1,440,000	1,440,000	1,200,000
Kansas City	Armco Steel Corp.	840,000	708,000	804,000
	Total	3,480,000	3,223,000	3,054,000

CLEVELAND

CITY	COMPANY	Rated Annual Capacity—Net Tons 1960	1959	1958
Cleveland	Jones & Laughlin Steel Corp.	1,945,000	1,945,000	1,820,000
Cleveland	Republic Steel Corp.	3,490,000	3,490,000	3,360,000
Lorain	U. S. Steel Corp.	2,678,000	2,648,000	2,580,000
	Total	8,113,000	8,083,000	7,760,000

SOUTHERN

CITY	COMPANY	Rated Annual Capacity—Net Tons 1960	1959	1958
Newport News	Newport News Shipbuilding & Drydock Co.	15,000	15,000	15,000
Roanoke	Roanoke Electric Steel Corp.	25,000	25,000	25,000
Atlanta	Atlantic Steel Co.	325,000	400,000	400,000
Tampa	Florida Steel Corp.	51,000	43,000	.....
Knoxville	Knoxville Iron Co.	38,000	38,000	38,000
Ensley	U. S. Steel Corp.	1,770,000	1,770,000	1,770,000
Fairfield	U. S. Steel Corp.	2,227,000	2,227,000	2,227,000
Birmingham	H. K. Porter Co., Inc.-Connors Div.	150,000	115,000	115,000
Birmingham	So. Electric Steel Co.	66,000	66,000	66,000
Gadsden	Republic Steel Corp.	1,209,000	1,209,000	1,197,000
Anniston	Kilby Steel Co.	34,020	34,020	34,020
Jackson	Mississippi Steel Corp.	45,000	45,000	45,000
Sand Springs	Armco Steel Corp.	140,000	120,000	120,000
Ft. Worth	Texas Steel Co.	192,280	132,450	132,450
Lone Star	Lone Star Steel Co.	800,000	800,000	660,000
Longview	R. G. Le Tourneau, Inc.	90,000	90,000	90,000
Houston	Armco Steel Corp.	1,385,000	1,284,000	1,284,000
Houston	Cameron Iron Works	58,800	58,800	58,800
Pampa	Cabot Shops, Inc.	18,000	16,200	14,500
	Total	8,619,100	8,488,470	8,291,770

NORTH EAST COAST

CITY	COMPANY	Rated Annual Capacity—Net Tons 1960	1959	1958
Worcester	U. .S Steel Corp.	.....	.....	287,000
Bridgeport	Carpenter Steel Co.	84,000	84,000	84,000
Phillipsdale	Washburn Wire Co.	93,000	93,000	93,000
Watervliet	Allegheny Ludlum Steel Corp.	76,300	77,000	77,000
Harrison	Crucible Steel Co. of America	7,800	7,800	7,800
Roebling	Colorado Fuel & Iron Corp.	235,000	235,000	235,000
Philadelphia	Midvale-Heppenstall Co.	175,000	157,700	157,700
Philadelphia	Pencoyd Steel & Forge Corp.	15,600	15,600	.....
Coatesville	Lukens Steel Co.	930,000	930,000	750,000
Phoenixville	Phoenix Steel Corp.	360,000	360,000	360,000
Ivy Rock	Alan Wood Steel Co.	800,000	800,000	800,000
Fairless Hills	U. S. Steel Corp.	2,687,000	2,687,000	2,400,000
Reading	Carpenter Steel Co.	87,500	87,500	86,600
Bethlehem	Bethlehem Steel Co.	3,900,000	3,900,000	3,900,000
Harrisburg	Phoenix Steel Corp.	486,760	486,760	486,760
Harrisburg	Harrisburg Steel Corp.	100,750	100,750	100,750
Steelton	Bethlehem Steel Co.	1,500,000	1,500,000	1,500,000
Milton	Merritt-Chapman & Scott Corp.	110,000	90,000	90,000
Burnham	Baldwin-Lima-Hamilton Corp.	188,710	188,710	188,710
Sparrows Point	Bethlehem Steel Co.	8,200,000	8,200,000	8,200,000
Baltimore	Armco Steel Corp.	108,000	102,000	102,000
Baltimore	Eastern Stainless Steel Co.	72,960	80,000	80,000
Claymont	Colorado Fuel & Iron Corp.	506,500	506,500	506,500
	Total	20,724,880	20,689,320	20,492,820
	Total United States—149 Plants—84 Companies	148,570,970	147,633,670	140,742,570

WEEKLY OPERATING RATES BY DISTRICTS, 1959-1960

Week Beginning	Total	North East Coast	Buffalo	Pitts-burgh	Youngs-town	Cleve-land	Detroit	Chicago	Cincin-nati	St. Louis	South	West
1959												
Jan. 5	73.6	65	70	75	63	81	94	79	76	101	68	72
12	74.6	66	71	77	64	84	92	79	78	99	72	74
19	72.6	69	68	71	57	79	95	77	73	99	73	77
26	76.9	74	77	79	62	84	81	80	80	107	74	82
Feb. 2	80.8	79	91	83	70	86	75	85	83	102	78	83
9	83.7	83	95	84	71	83	92	87	83	102	79	87
16	86.5	86	95	89	77	87	94	88	88	98	85	85
23	88.5	88	98	92	81	91	91	89	87	100	87	88
Mar. 2	90.3	92	98	94	84	89	98	91	86	105	89	86
9	92.0	96	101	95	84	94	100	93	84	99	91	85
16	92.9	97	101	96	87	94	102	94	82	102	92	86
23	92.9	98	99	97	87	96	96	92	86	101	94	87
30	93.2	97	96	96	88	100	99	92	82	99	98	93
Apr. 6	93.3	97	95	96	89	97	97	94	79	98	94	95
13	93.8	97	98	96	89	97	100	94	86	104	92	93
20	93.5	96	97	94	87	94	101	92	89	109	92	95
27	92.8	93	98	94	85	96	97	91	92	108	92	92
May 4	92.0	93	100	92	85	96	95	90	87	106	92	92
11	92.9	92	99	95	86	97	96	92	85	109	91	94
18	93.4	92	101	94	86	94	99	93	86	102	93	98
25	93.6	94	100	95	88	92	95	92	86	108	93	96
June 1	93.7	94	98	96	91	94	97	93	84	103	91	93
8	92.0	97	96	94	88	89	97	90	84	96	93	90
15	92.5	99	96	97	85	94	97	93	82	91	88	89
22	87.8	94	91	84	84	91	97	89	82	101	87	90
29	78.2	77	84	77	72	54	84	86	72	104	82	81
July 6	79.5	80	86	80	73	74	80	87	85	81	78	68
13	38.7											
20	12.9			GENERAL STRIKE JULY 15, 1959								
27	12.2											
Aug. 3	11.2											
10	11.8											
17	11.3			TO NOVEMBER 7, 1959								
24	11.7											
31	11.7											
Sept. 7	11.5											
14	12.6											
21	12.8											
28	12.8											
Oct. 5	12.5											
12	13.0											
19	13.1											
26	13.1											
Nov. 2	13.0											
9	45.6	51	45	44	40	41	46	42	66	92	31	44
16	78.9	89	89	81	78	76	81	72	82	105	64	80
23	89.7	99	100	93	87	88	94	86	87	108	85	78
30	93.6	100	103	96	92	93	97	92	88	110	87	91
Dec. 7	96.5	102	100	97	94	96	99	97	93	115	92	95
14	96.3	101	104	98	93	100	103	94	92	110	90	96
21	93.3	98	98	96	87	94	102	96	81	83	91	90
28	96.3	102	100	98	94	98	105	94	95	110	91	93
1960												
Jan. 4	95.3	100	102	96	96	97	107	94	101	90	95	87
11	95.7	99	102	97	94	96	111	96	103	99	94	85
18	95.7	100	101	97	93	98	109	95	99	101	94	87
25	95.4	101	107	98	92	100	90	94	101	107	91	87
Feb. 1	94.2	98	97	98	91	99	82	96	103	97	94	90
8	94.3	96	99	97	89	101	100	96	105	93	87	90
15	93.8	94	98	95	88	102	101	97	99	102	86	92
22	94.4	92	100	96	89	102	102	98	101	103	88	90
29	93.1	91	99	98	87	101	100	95	104	100	85	86

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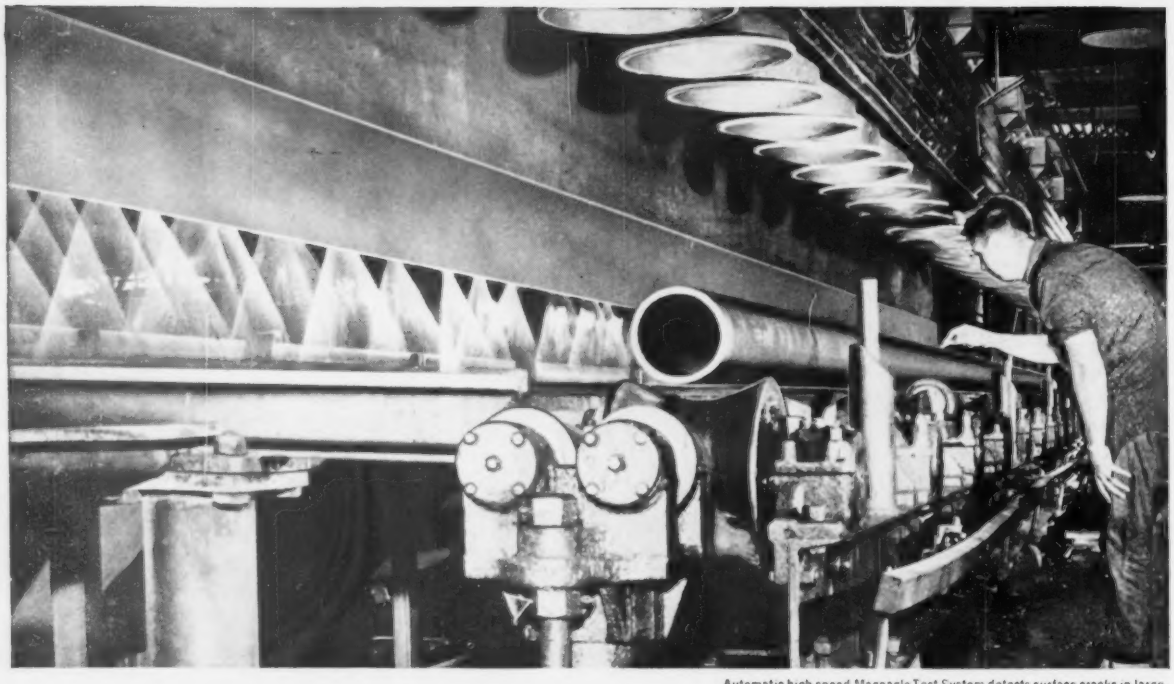

Automatic high speed Magnaglo Test System detects surface cracks in large tubing and pipe. Tube is supported over a roll conveyor by jacks which turn it for inspection on all sides. Cracks are marked with crayon for subsequent removal by grinding. Spray nozzles (left) bathe tube with Magnaglo fluorescent particle suspension before tube rolls into the inspection booth. Black light is supplied by a bank of 34 high intensity lamps.

automatic high speed testing

finds 1/10,000" cracks in 48' steel pipe

This pipe is critical. It goes into oil wells where, thousands of feet below the surface, a failure is not only expensive, but can cause the loss of much production from an entire oil field. So, even the smallest cracks must be found—and inspection must be fast.

Magnaflux devised the test system that includes fully automatic handling and testing of seamless tube up to 48' long and $10\frac{3}{4}$" in diameter. The big pipe is conveyed and passes in continuous flow through the Magnaflux-Magnaglo inspection unit. Magnetized under 6000 amperes, full wave DC, it passes under a double row of spray nozzles that bathe the pipe with specially developed fluorescent Magnaglo particles. Moving on, it is raised by jacks and rotated to permit inspection under black lights. Even the smallest crack is impossible to miss with Magnaglo. Only a single inspector is required.

Pipe with defects is tipped off the conveyor for corrective surface grinding on an adjacent grinding table, and retesting. No pipe with significant defects ever gets to a customer!

This high-speed automatic unit is just one example of Magnaflux' ability to supply test systems to meet virtually any testing need. These can be automatic, conveyorized inspection or individual parts inspection, for ferrous or nonferrous materials.

There is—or can be developed—a Magnaflux Test System to meet your test needs exactly, for a few parts or a few million—from billets to bolts. The Magnaflux Field Engineer, backed by the total experience of Magnaflux—"The House of Answers in Nondestructive Testing"—is ready now—to help you get *more* profitable production to *any* quality level *your* use determines.

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ZYGLO for nonmagnetic and other materials; cracks, leaks, etc.
SONIZON Ultrasonic Thickness Measuring
STRESSCOAT to find and measure stress on parts, overall!
MAGNATEST electronic testing for hardness, conductivity, alloy, proximity, and many more. Also for precision magnetic field measurement.
And still other methods and techniques, some completely new.

Walter L. Seelbach

He Gave 50 Years of Leadership

Two major foundry organizations are honoring W. L. Seelbach for his untiring leadership for 50 years.

Mr. Seelbach helped organize and build the groups into the highly respected organizations they are today.

WALTER L. SEELBACH: A half century of quality performance.

▪ Most industrial officials look on work for their trade association as a thankless task at best. Yet Cleveland foundryman Walter Seelbach has been waist deep in foundry trade association and government work without pay for 50 years. At the same time he headed a major foundry himself, Superior Foundry in Cleveland.

This week a joint testimonial dinner is being held in his honor in Cleveland by the two leading associations in his industry, the Gray Iron Founders Society, Inc., and the Northeastern Ohio chapter of the American Foundrymen's Society.

Golden Year—He helped found both groups, and they have already given him high honors years back. So the occasion now is his 50th anniversary in the industry.

He is the only man ever called back for a second term as president of the GIFS and has headed a host of committees over the years. He received its highest award, the Gold Medal in 1951. He has also received a coveted citation from both the GIFS and the AFS.

The Presidency—In the early 20s he began his industry service and in 1926 became president of the old Ohio Foundrymen's Assn. This group later became the area chapter of the AFS. He helped organize and became first president in 1928 of the Gray Iron Institute which has since grown into the Gray Iron Founders Society.

He is also a past president of Associated Industries of Cleveland, a non-profit labor relations association, and was vice president of the Better Business Bureau. He also is a past chairman of Case Institute's Industrial Committee for the Foundry Educational Foundation.

Government Work—In government work his service as an industry aide has been equally impressive. In World War II and the Korean War he served as industry member of the Cleveland regional War Labor Board

Before the war he was chairman of a National Recovery Authority foundry committee. He has been an AFS official delegate to three International Congresses in Europe and presided over the Congress at Atlantic City in 1952.

The Way Up—Mr. Seelbach got his foot in the door of the foundry industry as a timekeeper for the Walworth Run Foundries in Cleveland after studying civil engineering at Case Institute. He rose to assistant manager and secretary treasurer of Walworth and held the same post when it merged with Forest City Foundries, Cleveland. He then rose to vice president before resigning to acquire and become president of Superior Foundry, Inc., Cleveland.

To the Executive
who watches his Competition closely . . .

Are you investigating Clad-Rex Vinyl-Metal Laminates?

Don't wait *too* long! Because Clad-Rex really reduces manufacturing costs *and* increases product sales appeal. And *that* kind of advantage would be better yours than your competitor's. Many other manufacturing executives are already using Clad-Rex vinyl-metal laminates for electronic equipment cabinets . . . automotive trim . . . appliances . . . furniture, etc.

Here are the facts:

Clad-Rex is a calendered, semi-rigid poly-vinyl chloride film laminated to sheet metal. All alloys and tempers of aluminum and steel (including galvanized and aluminized) are commonly used. Other metals can be used where their special properties are important to end product performance.

The most obvious advantage of Clad-Rex vinyl-metal laminates is styling. It's unlimited! Simulated woodgrains and leathers as well as a wide variety of colors and textures in sparkling burnishes (including high metallics), or non-reflective matte finishes. You can design your own if you prefer!

Not so obvious, *but most important of all*—Clad-Rex vinyl-metal laminates are practical. There is no complex technique or special tooling required to fabricate Clad-Rex. It can be fabricated in almost as many ways as any *un*-finished sheet metal. Furthermore, and without charge, a Field Fabricating Engineer is provided to show your production people how easy it is to get into production with Clad-Rex.

Actually, Clad-Rex *simplifies* your manufacturing operations. It's finished before you get it. Movement of sub-assemblies, etc., through your plant becomes more direct—out of your dies into assembly.

Clad-Rex lowers your end product cost. Although Clad-Rex costs more than *un*finished metal coming into your plant, elimination of expensive handling and finishing adds up to *less cost* when your product is ready to ship. Clad-Rex resistance to abrasion often eliminates the rejects common to *un*finished or other pre-finished metals. This includes the costly efforts to salvage those rejects, too.

Your product may need these other characteristics of Clad-Rex vinyl-metal laminates—high dielectric strength, and resistance to the corrosion of acids, alkalis, and household detergents.

So, see for yourself. Write for details. No obligation, of course. Perhaps you won't be first in your field to begin using Clad-Rex. But why risk competitive disadvantage by being last?

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3-A

Trends to Watch This Spring

Spending in three business areas this spring may decide how strong 1960 will be.

The areas to watch: Consumer spending, auto sales, and construction activity.

▪ What happens in the next few months may decide how strong a year 1960 will be.

March, April and May activity in three areas will be important. These are: Consumer spending in general, auto purchases, and construction.

Watch the Consumer—All three were counted on heavily to power the boom this year. They will now be watched to see if they can halt the recent slowdown in business.

Continued consumer confidence —shown through buying—will help whittle down inventories, which are causing concern among manufacturers.

Manufacturers' stocks rose by $750 million in January, the Dept. of Commerce reports. Significantly, about $500 million of the increase was in durable goods. And nearly half of this gain in durables was in the machinery industries.

Lag in Durables—Spending for durables has lagged behind other types of consumer spending. Between the third and fourth quarters of 1959 total personal spending (on a seasonaly adjusted basis) rose about $3.7 billion dollars. Spending for services went up $2.4 billion. Buying of non-durables increased by $2.1 billion. But spending for durables dropped by $800 million.

Among the durables being watched closely are autos. By the beginning of this month, dealer inventories probably passed the 1 million mark. This is an all-time high, topping the previous record of 965,000 set last July.

Sales "Explosion?" — These large dealer stocks have resulted in production cutbacks. Automakers are counting on a sales "explosion" this spring to revive the market (See story on P. 82.) If it doesn't come, the auto industry and the economy will suffer.

A strong surge of construction spending—especially for plants and equipment — will help. Actually, construction has been holding up well, despite seasonal handicaps.

Strong February—February construction activity set a new record for the month. The value of new construction put in place was $3.6 billion, up 2 pct from the same 1959 month, Commerce reports.

Private construction was 7 pct above the same month a year ago. Residential construction declined less than seasonally.

Public construction, however, fell off in the first two months of 1960. Most types of public construction shared in the decline. But, except for highway spending, the decreases were less than seasonal.

How to Rate Forecasts

▪ How good is a business forecast? And how do you decide whether it's sound?

Distinguishing fact from fancy among predictions is difficult, says A. G. Abramson, director of economic planning for SKF Industries, Inc., Phila.

Four-Point Test—Dr. Abramson adds the problem is complicated by the fact that "the experts may be wrong or may disagree." He outlines a four-point test program businessmen can use on forecasts. His suggestions:

Never base a business decision on a forecast simply because it's fashionable—but not necessary.

Find out the basis for a forecaster's conclusions. "All forecasts are judgments," Dr. Abramson cautions, "but business decisions are too important to be based on a hunch or uninformed opinion."

How Deep? — When analyzing trends, try to use trained analysts representing reputable firms.

Remember some forecasts are easier to make than others. For example, he notes, it's easier to predict things will be better than to predict by how much and exactly when. But if a simpler forecast is adequate, don't demand a more difficult one, he adds.

New Orders Declined In January

January shipments by manufacturers continued at December's high levels, Commerce says. But new orders declined slightly. With the inflow of new orders not matching January shipments, manufacturers' backlogs dipped.

New business slowed down in both the durable and nondurable goods sectors. Metals producers sales eased from post-steel strike rates and near-record December levels.

This 3¢ screw cuts costs $24

83% saving on fasteners per compressor unit revealed by RB&W survey... substituting standard cap screws for alloy screws.

This was no case of cutting corners on fastener quality. Nor was it in any way a compromise with good engineering. It was rather a reflection of the ability of the RB&W Fastener Man to look realistically at a product, and its blueprint specifications, and know what fasteners can best do the job.

His inspection showed that alloy socket head cap screws were being used for external connections which did not require such costly steel for tight joints. Nor were they installed in tight spots or recessed holes. Why then *waste* their cost? His report recommended switching to bright cap screws. Sufficient joint strength would be obtained. But instead of spending $28.88 for 147 socket screws, the unit would take $4.88 worth of cap screws . . . a saving of $24 *per unit*, and pure profit!

Want to be sure you're avoiding needless costs in fastener usage, and getting the *most* from your fastener dollars? Ask an RB&W man to make a survey. No obligation. Contact Russell, Burdsall & Ward Bolt and Nut Company, Port Chester, N. Y.

R B & W
115th year

Plants at: Port Chester, N. Y.; Coraopolis, Pa.; Rock Falls, Ill.; Los Angeles, Calif. Additional sales offices at: Ardmore (Phila.), Pa.; Pittsburgh; Detroit; Chicago; Dallas; San Francisco. Sales agents at: Cleveland, Milwaukee; New Orleans; Denver, Fargo. Distributors from coast to coast.

Can U.S. Hurtle Europe's Wall?

Prohibitive Tariffs and Taxes Keep Out American Cars

Will the new compact cars help U. S. automakers regain part of the once large European market?

One auto executive doesn't believe so. Problems involve more than car size.—By A. E. Fleming.

▪ Popularity of foreign cars isn't the only reason for an out of kilter import-export picture in the U. S.

A major reason why imports sell like hotcakes in the U. S., while most U. S.-built models are shunned overseas is "discriminatory practices" in duty, taxes and shipping rates, says W. H. Thoreson, director of automotive export for American Motors.

Road Blocks—Mr. Thoreson says duty and taxes in European countries are set at almost prohibitive levels, and shipping charges from our East Coast ports to Europe are double those for the same car returning to the U. S. Consequently, only wealthy Europeans, as a rule, are buying American cars.

These barriers have been rough to overcome, he says. They led to a postwar low of 116,520 cars from the U. S. to foreign markets in 1959. Meanwhile, import shipments soared to a record 668,070.

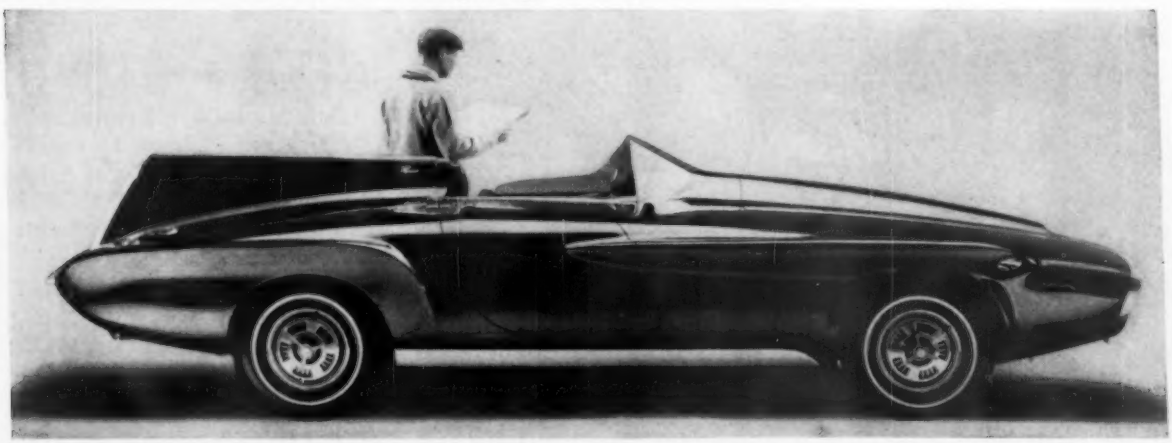
"At best, the U. S. will hold its own in 1960," Mr. Thoreson predicts, "even though many of the cars built abroad are too small for average family use, and are underpowered." He doesn't see domestic cars putting much of a dent in the overseas market, even though Rambler sales abroad are continuing to climb and other U. S. compacts are now available to whet foreign interest.

One-Way Street — "Duty rates and taxes on U. S. cars in Europe are impossible," he points out. "They range from 35 to 69 pct in countries with their own car-making plants, based on landed cost price, including ocean freight and marine insurance, on engine cubic inch displacement and/or weight."

By contrast, the U. S. charges a flat 8.5 pct import duty on all cars, excluding ocean freight, plus 10 pct Federal excise. All imports get the same treatment, regardless of size, horsepower, weight, price or country of origin.

The U. S. rate used to be higher. But at intervals in recent years it's been lowered by 0.5 pct to help bring about tariff reciprocity. But reciprocity hasn't been realized from an automotive point of view," claims Mr. Thoreson. "It's time we stopped making automotive tariff

New Idea Car Centers Styling Around Driver



"X" MARKS THE CAR: Plymouth's XNR idea car departs from conventional styling by putting streamlining features off center and concentrated around the driver. Built on a 106 in. wheelbase, it is 195 in. long and 46 in. high from the ground to the top of the windshield. The two-passenger sports car was designed by and named for Virgil M. Exner, Chrysler Corp.'s vice president and director of styling.

reductions a one-way street."

Limited Access—The AM official says the situation isn't improving. "Certain car-producing countries in Europe, which now have a great stake in the U. S. market, claim they have eased restrictions against our cars," he says.

"But the steps have been mostly meaningless. We feel other automobile manufacturing nations, which enjoy relatively free access to the U. S. auto market, should give our automobiles reasonably similar treatment," Mr. Thoreson contends.

Formation of the European Economic Community (Common Market) isn't likely to ease the situation, as Mr. Thoreson sees it. West Germany, France, Italy, the Netherlands, Luxembourg and Belgium formed the group a year ago. They decided on an eventual average of a 31 pct import duty rate on cars imported from non-member nations, plus taxes set separately by each member nation.

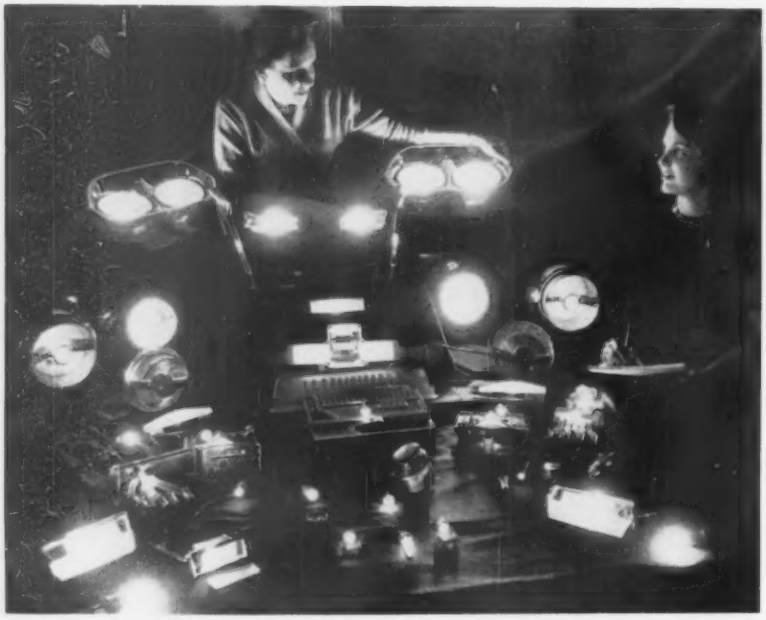
At the same time, duties are being reduced on EEC member products. By 1970 there will be no duties levied against any products of these countries. Similar objectives were set later in 1959 by the Outer Seven Free Trade Area. This group includes Great Britain, Switzerland, Norway, Sweden, Austria, Denmark and Portugal.

Yankee Stay Home—Mr. Thoreson says shipping charges set by international ocean shipping conferences also work to the disadvantage of U. S. auto makers. "For example," he says, "a Rambler shipped from New York to Germany has a freight bill of $328. But if the same car is shipped back to New York the charge is only $158.

"This illogical and unfair method of determining ocean rates serves further to discourage the purchase of American-built cars in Europe, and to encourage the importation of European cars into this country," he says.

Mr. Thoreson takes exception to arguments that perhaps domestic auto makers shouldn't be too upset by their current import-export disadvantage because it was the other way around for many years. "The disparity in our favor in early postwar years wasn't caused by discriminatory taxes on our part. It was because Europe simply didn't have the capacity to produce cars in great quantity."

Automaker Presents Illuminating Facts



LIGHT RESEARCH: There are between 20 and 25 light sockets in the average six-room house. But these young ladies at Chrysler Corp.'s Electrical Engineering Dept. found there are 40 light bulbs in the 1960 Dodge Dart. The 40 bulbs deliver a total of 100,000 candlepower. In 1925 a car had an average of 5.5 lamps.

Liberty Loads

Busiest harbor for its imports is New York, according to Renault statistics. A record 108,926 of the French cars came into the U. S. in 1959, representing 23 pct of Renault's passenger vehicle production of 461,097.

They were received at 17 U. S. ports. Biggest volume hit New York harbor, where 36,579 arrived, one-third of the U. S. total. Houston's volume of 13,862 was second. Third was Los Angeles' 12,667.

A fleet of converted Liberty ships specially fitted to transport up to 1100 cars each to the U. S. from France, are in exclusive Renault service. The fleet will be expanded to 20 ships in 1960 to handle an increasing number of Renaults coming into the U. S.

Falcon Ranchero

Ford Motor Co. will introduce its Falcon Ranchero truck this month. The pickup truck will list at a suggested retail price of $1862, with turn indicators and oil filter standard equipment.

Production is underway at Ford Div. plants in San Jose, Calif., Lorain, O., and Kansas City, Mo.

Ford envisions a good market for the economy-size model. The company says many individual business operators are presently running trucks that top their hauling requirements because of the lack of a vehicle that fits their specific need.

THE TONY ACCETTA "PET" SPOON, made of Revere Brass Strip has been awarded the Medal of Honor by Sportsman's Club of America for superiority of design and fish-getting ability while all Tony Accetta Baits have received National Sportsman's Research Award . . . a real tribute to design, construction and effectiveness.

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Says the Senior Accetta, "The high quality of Revere Brass has, without a doubt, contributed immeasurably to the quality of our lures. In fact, Revere Brass is of such fine quality and finish, uniform grain size and structure that even after stamping and forming only a minimum of work is required prior to chromium plating. This means we save on both forming and finishing costs. Since we have been using Revere Brass we have not had a single customer complain due to poor quality material."

Why not put the extensive knowledge of Revere's sales representatives to work for you? With the wide variety of metals at their disposal, perhaps they can help you select the metal best suited for the job, with a resultant saving of money while improving product quality.

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Need a larger shaft without disturbing envelope dimensions? Take advantage of a Hyatt option by omitting the inner race. You can add the thickness of the Hyatt inner race to the shaft and let the rollers operate directly on shaft. Just be sure that the shaft is suitably hardened and ground. Hyatt Bearings Division, General Motors Corporation, Harrison, New Jersey.

Replacement bearings available through United Motors System and its authorized bearing distributors.

HYATT HY-ROLL BEARINGS

IN ROLLER BEARINGS HYATT IS THE WORD FOR GM GENERAL MOTORS RELIABILITY

Confusion Hurts Space Progress

Strong, Central Direction of Space Program Needed

It's getting embarassing that the nation is still not well-organized in its space program.

There is too much bickering and not enough national spirit involved.—By G. H. Baker.

▪ Fact that the U. S. is still not well organized in exploration of space is becoming more costly and more embarrassing. National confusion is not only wasteful of tax dollars, but also of national prestige.

It is becoming more and more obvious that President Eisenhower cannot much longer put off cracking some bureaucratic heads together. Strong, central direction is vitally needed. An end to the intramural bickering among government agencies as to who's in charge of space studies is long overdue.

The Right Ingredient—Another essential ingredient is also badly needed: The national will to be first and best in the race to understand and control space.

The unpleasant but blunt appraisal is simply this: At present the nation is supplying neither the dollars nor the will to succeed.

There Are Workers—This is not to overlook the zealous and conscientious space engineering studies being carried on by dedicated men in and out of government. It is simply a statement of the obvious —that not enough people really care whether the U. S. is the top nation on this planet in the understanding of space or not.

There is much criticism over the government's unwillingness to spend more on its study of space. Much of this criticism is justified.

Only One Way—But there are limiting factors to keep in mind: There is a maximum amount of research and engineering that can be tackled at any one time. Beyond a saturation point, money is wasted.

Secondly, without the will—the zealous desire to succeed—all time and money are wasted. To be second-best is to be last.

Committee Confusion

One reason for the government's confusion in the study of space is the plethora of space committees. Organization muddles are shockingly numerous.

Decisions involving space technology and engineering must be passed upon by dozens of committees, many of them staffed by old-line government clerks who lack an understanding of the complex scientific matters before them.

A "Must" Decision — Whether anyone likes having "czars" in government or not, its is increasingly evident that President Eisenhower is going to have to decide whether the Pentagon (military) or the NASA (civilian) shall assume complete direction in space projects.

The existing multi-headed organizational creature is incapable of efficient administration.

One Agency for Space?

▪ Space exploration should be in civilian hands, a leading space scientist says.

Dr. William H. Pickering, who was chiefly responsible for firing our first earth satellites, says one reason for our muddled progress is the lack of any central purpose to our space exploration efforts.

Too Much Bickering—Turn the job over to the National Aeronautics and Space Administration (NASA), Dr. Pickering urges. As matters stand now, the NASA and a number of military agencies all have a finger in the pie. Nobody is in complete charge. Bickering is rampant. Much time and money are wasted.

In addition, Dr. Pickering says, we should be spending twice as much on the study of space as we are now. He is in open disagreement with President Eisenhower, too, in urging that we set ourselves some exploration goals and pursue them.

Space Race—"We should frankly admit what the rest of the world knows—that we are indeed in a race with the U.S.S.R. in space," he declares.

Let's omit the meddling from military men and let the nation's civilian space and propulsion scientists and engineers get on with the job, he urges. NASA, he insists, is in an ideal position to supply the bold and imaginative direction that is now so sadly lacking.

"If we had the courage to embark upon a program of considerably larger magnitude, we'd be in a much better position," he insists.

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Why Western Firms Look East

Merger Route Likely When Expansion Beckons

When West Coast companies feel the need to "go national," expansion at home may not be the best method.

Many are looking for mergers, and many have already taken the step.—By R. R. Kay.

▪ Do you keep growing up in your own backyard? Or do you look for new fields to conquer? This problem faces many a Farwestern firm.

Put it another way. When does it pay to quit expanding in your area and take on the markets east of the Rockies?

When to Go National — It's a puzzle to many companies on the Coast who are riding the tide of economic expansion. The growing pains are the same for small and large firms.

What happens when a metalworker in the West gets big enough to "go national"? He often finds it just doesn't pay to ship his products east. Freight rates west-to-east are stiff.

So he's less likely to produce for the national market in his home plant. He begins shopping around for a plant site close to the large eastern and midwestern markets.

The Pitfalls—By expanding away from the West, he avoids:

1. Higher steel and raw materials costs that stem from high freight rates;
2. Labor rates jacked up by high-paying defense industries;
3. A high California tax rate;
4. Booming land costs.

The Dilemma — Some industrial areas around the country now offer virtually free factory sites. That's a powerful incentive when good Los Angeles-area sites sell for $5000 to $8000 per acre.

But some companies don't want to get involved in setting up a new operation. If they want to keep growing, a merger might be a good route to take. There's a strong trend in that direction — very marked in recent months.

Merger Trend — At the same time, the east-to-west merger trend goes on. Giant eastern firms have men on the West Coast right along. They spend full time checking out merger prospects.

Diesel Engine for Underground Duty

SERVICE WITH TITAN: Large diesel engine, built by Worthington Corp., is one of 24 for first operational Titan ICBM base near Denver, Colo. It will be housed underground within reinforced concrete walls.

***Experience**—the added alloy in* **Allegheny Stainless**

HIGH TEMPERATURE ALLOYS YOU CAN WELD OR BRAZE LIKE STAINLESS

In addition to their high strength characteristics, AM 350 and AM 355, A-L's precipitation hardening stainless steels, have other advantages for designers of missiles and supersonic aircraft.

When welding AM 350 and AM 355, there is little or no tendency to hot cracking or poor weld ductility, even in heavy sections. Both alloys weld as easily as the common stainless steels, even in the completely heat-treated condition. Brazability is equally easy—no special surface preparation is required during brazing operations.

Due to the high ductility in the annealed condition both alloys lend themselves to various kinds of fabrication—they can be spun, machined or formed using normal procedures.

In the heat-treated conditions, AM 350 and AM 355 have remarkable strength-to-weight ratio at both room and elevated temperatures, retaining useful strength and ductility up to 1000 F.

AM 350 is available commercially in sheet, strip, foil, small bars and wire. AM 355, best suited for heavier sections, is available commercially in forgings, forging billets, plates, bars, wire, sheet and strip.

For further information, see your A-L sales engineer or write for the new technical booklet, "AM 350 and AM 355." ***Allegheny Ludlum Steel Corporation, Oliver Building, Pittsburgh 22, Pa.*** 882

ALLEGHENY LUDLUM

EVERY FORM OF STAINLESS . . . EVERY HELP IN USING IT

New Machine Shows Versatility

Ideal for Small Plants, It Combines Operations

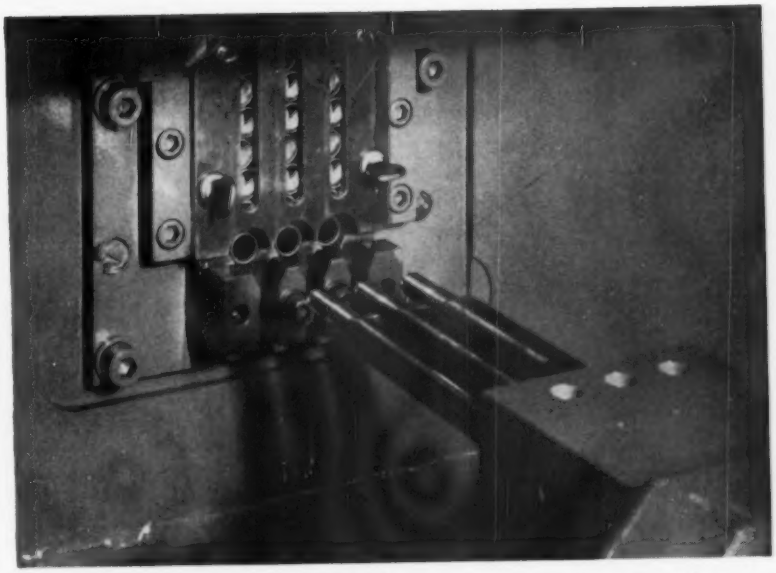
Trunnion-transfer unit is designed to make a family of 17 different adjuster arms.

It performs operations requiring both stationary position and rotating the part. —By R. H. Eshelman.

■ Parts production in many plants is already beginning to reflect some of the changes expected in metalworking in the sixties.

With products aimed at specific markets, high production is taking on new meaning. Often it is based on a family of parts. While production of a single part would not justify development of a special automatic machine, volume for the family of parts does.

An example of this is a trunnion unit built by Cross Co., Detroit. It was designed to make a family of 17 different adjuster arms for air brakes. Key to the machine's success is adjustable tooling.



BUSHING ASSEMBLY: Parts feed down three tracks where they are picked up by push rods which position, seat, and size them. To change bushing size, operator empties tracks and hopper.

Many Advantages—In the past, parts that required varied operations were nearly always tooled on separate machines. Now several types of operations are done in a combination unit. The machine rotates the part where necessary; holds it stationary when required.

This means low labor costs, less floor space. Also you can expect improved quality through elimination of the conventional manual handling and storage.

According to Kurt O. Tech, Cross' vice president-engineering, "An assembly operation on this trunnion machine marks an industry first . . . automatic assembly included in a machine for processing a variety of parts. It is the first time a long production run was not the primary requirement for automatic assembly on the machine that makes the part."

Four Stations — This trunnion machine has four stations. It drills, chamfers and reams the slack-adjuster arms. And it inserts bushings in from one to three holes in each. Part differences are numerous. They include amount of tang offset, number of holes, location, and size of holes. Yet production is 150 pieces per hour at 100 pct efficiency.

Four adjustable work-holding fixtures make this volume production possible. Operators slip workpieces over horizontal plugs in the fixtures. These accurately locate the large opening. Two plug sizes in various positions cover the current family of parts. Plugs are moved laterally and keyed for the body of the arm. So tangs are always clamped in the same plane, regardless of offset.

For Small Plants—In the unusual assembly operation, a vibratory hopper feeds the bushings. Three vertical tracks position them in front of push rods. A blade orients them in the hopper. Only two sizes of piloted push rods are needed. Another feature becoming more popular for automation is fog lubrication. This avoids some common sealing problems.

This machine is representative of current automation trends. Machine tool builders and production experts feel it will afford smaller plants opportunities for cost reduction, without high investment usually needed in special development and engineering.

INDUSTRIAL BRIEFS

Way Out West—Bliss & Laughlin, Inc. has acquired Sierra Drawn Steel Corp. Expansion of western operations is planned. Plans include the purchase of property in Los Angeles for a cold finishing steel mill. It will replace Sierra's local plant at 5821 E. Randolph St., Los Angeles.

Tightening Up—Vitro Chemical Co., New York, is consolidating its manufacturing activities. With the exception of uranium concentrates, the entire line of chemicals will be produced at its Chattanooga, Tenn., plant. Inorganic chemicals, including nickel salts, will be transferred from Canonsburg, Pa. The move is scheduled for completion by summer.

Another Foote—Foote Mineral Co., Philadelphia, has authorized purchase of a 670-acre tract of land in the New Johnsonville, Tenn., area. The tract will be studied as a site for a new electrolytic manganese facility. Foote now operates two similar plants in Knoxville, Tenn.

Park Place—A new plant has been opened by MiLat Machine & Tool Co., formerly of Brooklyn, N. Y. It is located in Expressway Industrial Park, Plainview, Long Island. MiLat produces and assembles precision metal stampings. A 100 pct increase in production capacity accompanied the move.

Doubles—Output of sinter for charging two blast furnaces at the Trenton, Mich. Works of McLouth Steel Corp. will be doubled. A second sinter plant is being built by Dravo Corp., Pittsburgh. Dravo also is completing a contract for expansion of boiler house and pump facilities at the Trenton works.

Active Duty—Kropp Forge Co. acquired the job forging operations of Giant Grip Mfg. Co., Oshkosh, Wis. This includes about 500 active steel forging dies. Forgings produced by Giant Grip are mostly for commercial use.

New Line — The Union Twist Drill Co., Athol, Mass., is manufacturing and selling under the name of their Hartex Div., a line of tool and cutter grinders. This Hartex (UTD) line consists of five basic machines. They will be sold and serviced through authorized machine tool distributors in the U. S. and Canada.

Zeus Contract — A $5 million diesel contract has been received by Cooper-Bessemer Corp. for the Army's Zeus program. The company will supply 11 highly specialized 1500 kw diesel engine generator sets. They will be complete with associated mechanical, electrical and control equipment.

Philadelphia Armour — Armour Alliance Industries, Alliance, O., has opened a new industrial adhesives plant at Philadelphia. The plant contains storage space, packing and shipping facilities. The office and lab facilities will be used by adhesive sales and technical service personnel serving East Coast markets.

North of the Border—Robotron Corp., Detroit, manufacturers of industrial electronic control systems, has opened a new subsidiary, Robotron of Canada, Ltd., Sandwich West, near Windsor, Ont. The new plant will produce Robotron controls and equipment for Canada's markets.

"John! Your language, please, try to think of the children."

Cash Deal—Northrop Corp. and American Radiator & Standard Sanitary Corp. have jointly announced the purchase by Northrop of American Standard's Military Products Div. Northrop is buying the assets for cash. The unit will be kept under present management at its location, Norwood, Mass.

Southern Stretch — The Ohio Rubber Co., Div. of The Eagle-Picher Co., plans immediate construction of a new plant at Fort Smith, Ark. The facility is scheduled for completion about Feb. 1, 1961, and will cost about $3 million. It will combine the newest engineering and manufacturing concepts in the mechanical rubber goods industry.

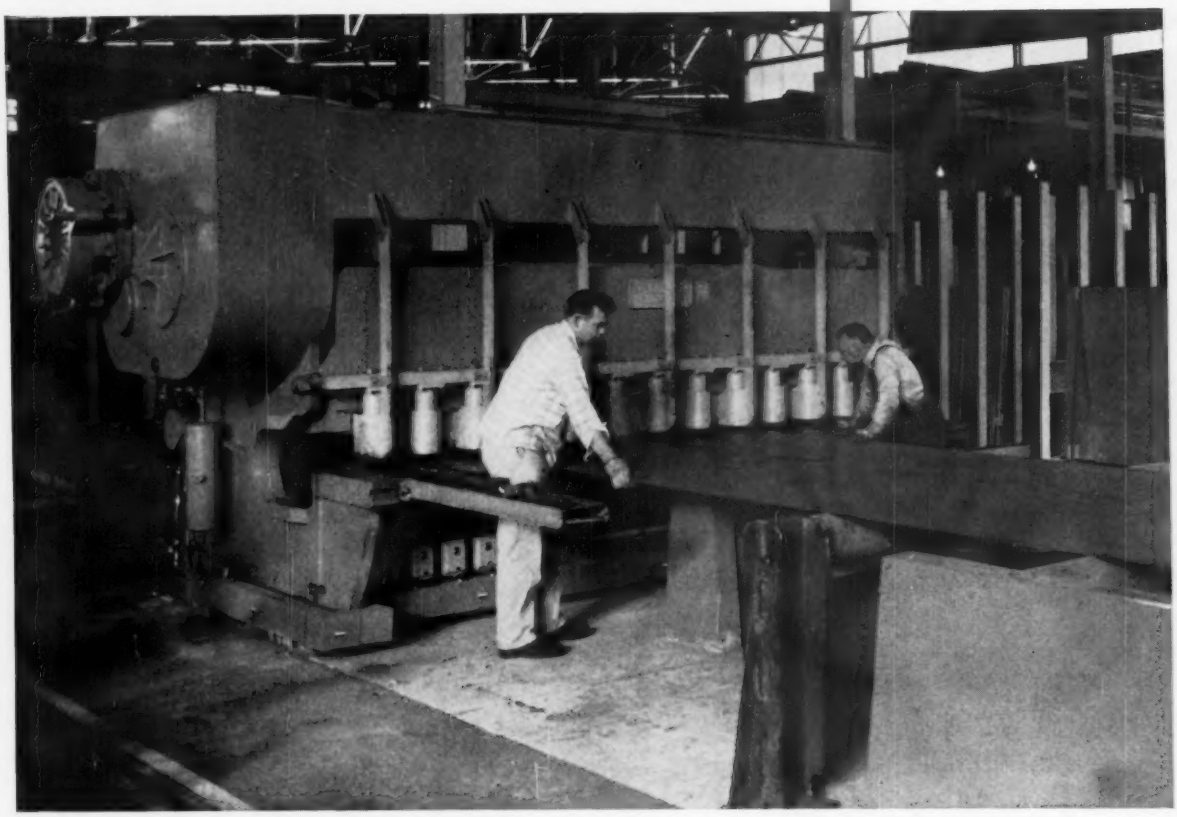
Suburbia — Vanadium - Alloys Steel Co., manufacturer of tool and special steels, has opened a warehouse in the Philadelphia area. The company will keep its main Philadelphia sales office at Wynnewood, Pa.

Ladles for J&L—Pennsylvania Engineering Corp., New Castle, Pa., has an order for 20 230-ton ladles for use in Jones & Laughlin Steel Corp.'s Cleveland Works expansion program. The order was received from Koppers Co., prime contractor. Pennsylvania Engineering will fabricate fifteen teeming ladles and five hot metal ladles.

Mission Project—Western-Knapp Engineering Co., San Francisco, has a contract to construct a 15,000 ton per day copper flotation concentrator for American Smelting & Refining Co. It is for the Mission Project near Tucson, Ariz. Total cost is estimated at over $40 million. Completion is scheduled for September, 1960.

Expanding Electron—Litton Industries has opened its new addition located at 960 Industrial Rd., San Carlos, Calif. The Electron Tube Div. expansion represents a $2 million investment, including electronics equipment. It will house the division's Klystron product line and Display Devices product line.

METALS WAREHOUSE CHOOSES STEELWELD SHEAR



Shearing A7 carbon plate ½" x 96" x 30'. This is a mechanically operated 12E-12 Steelweld Pivoted-Blade Shear.

Proves Highly Advantageous in New Berkeley Warehouse of Ducommun Metals & Supply Co.

VERSATILITY, speed, accuracy and ease of operation were dominant factors that led Ducommun Metals & Supply Co. to select a Steelweld Shear for its new metals warehouse in Berkeley, California.

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PIVOTED BLADE

Mechanical and Hydraulic **SHEARS**

Steelweld Machinery includes: Mechanical & Hydraulic Shears and Press Brakes, One-, Two- and Four-Point Straight-Side Presses, Speed-Draw Presses.

Ducommun's report on the shear follows:

1. **Used for:** A7 plate 3/16" to 3/4" x 12 ft.
   Aluminum plate 3/16" to 3/4" x 12 ft.
   Stainless plate 1/8" to 1/2" x 12 ft.
   Brass & Copper 3/16" to 3/4" x 8 ft.
2. An important advantage is ease of shearing a wide variety of types and sizes of metals each day from thin narrow strips to heavy, wide plates. The knife clearance adjustment, plus the fast and accurate power back gage, makes changes from one thickness and size to another very fast, yet permits us to produce high quality shearing.
3. Another reason for selecting the Steelweld Shear was the low rake angle of the blade. This permits flatter shearing.
4. The power back gage offers a plus factor in that we can use it in conjunction with our front feed rolls to back off plate for accurate alignment when shearing to a front gage.
5. When the Steelweld Shear was being installed, our sheet shear was being re-located in the warehouse, and we could not shear an order for 26 gage stainless. With the Steelweld knife clearance adjustment, we were able to shear the material very accurately with a minimum of burr.
6. Operator is very pleased with ease of operation and the many adjustments available.

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- Ohioloy "K" Rolls
- Flintuff Rolls
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- Chilled Iron Rolls
- Denso Iron Rolls
- Nickel Grain Rolls
- Special Iron Rolls
- Nioloy Rolls

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THE OHIO STEEL FOUNDRY CO., LIMA, OHIO

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P. J. Monaghan, appointed vice president, Manufacturing Staff, General Motors Corp.

Pure Carbonic Co., Div. of Air Reduction Co., Inc.—**G. C. Cusack,** named president.

Calumet & Hecla, Inc., Calumet Div.—**Paul Dashine,** named president and general manager.

Crucible Steel Casting Co.—**Charles Locke,** elected vice president.

The Gabriel Co., Gabriel Div.—**H. J. Christ, Jr.,** appointed vice president, operations.

The Standard Tube Co.—**P. C. Hintz,** appointed vice president, sales.

Atlantic Steel Co. — **R. E. O'Neill,** elected vice president, sales.

Chase Brass & Copper Co., Inc. —**H. H. Kremer,** elected vice president, sales and a director; **W. E. Evans,** named asst. to the president; **P. M. Thomas,** appointed general sales manager.

Automotive Materials Corp.—**J. F. Bramham,** appointed vice president of the company, and general manager of Pilgrim Drawn Steel Div., Plymouth, Mich.

The Risdon Mfg. Co. — **L. A. Dibble, Jr.,** elected executive vice president; **L. F. Heileman, Edward Noyack** and **D. S. Tuttle, Jr.,** elected vice presidents; **Malcolm Baldridge** and Mr. Tuttle, elected directors.

Volco Brass & Copper Co.—**J. C. McCormack,** appointed executive vice president; **W. V. Mernick,** vice president, sales, and **W. C. Drayton,** general sales manager of the company and vice president of New Jersey Rolling Mills, a subsidiary of Volco.

Precision Casting Co.—**W. N. Brammer,** appointed vice president, marketing.

Hewitt Rubber Div., Hewitt-Robins, Inc.—**E. J. Mytkowicz,** appointed vice president, operations.

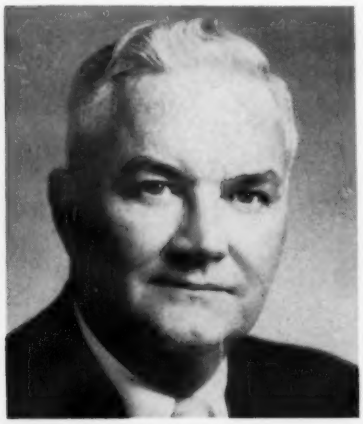
J. S. Locke, becomes vice president and general manager, Brown Instruments Div., Minneapolis-Honeywell Regulator Co.

The Yale & Towne Mfg. Co.—**W. D. Black,** appointed asst. to the vice president.

Koppers Co., Inc., Metal Products Div. — **J. E. Meyers,** named marketing manager, Sound Control Dept., Baltimore, Md.

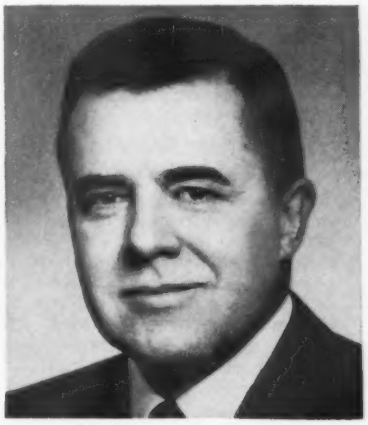
Continental Can Co., Metal Div. —**R. S. Hatfield,** becomes asst. general manager; **R. D. Heaviside,** named general manager, metal can sales; **L. C. Dudley,** named general

(Continued on P. 113)

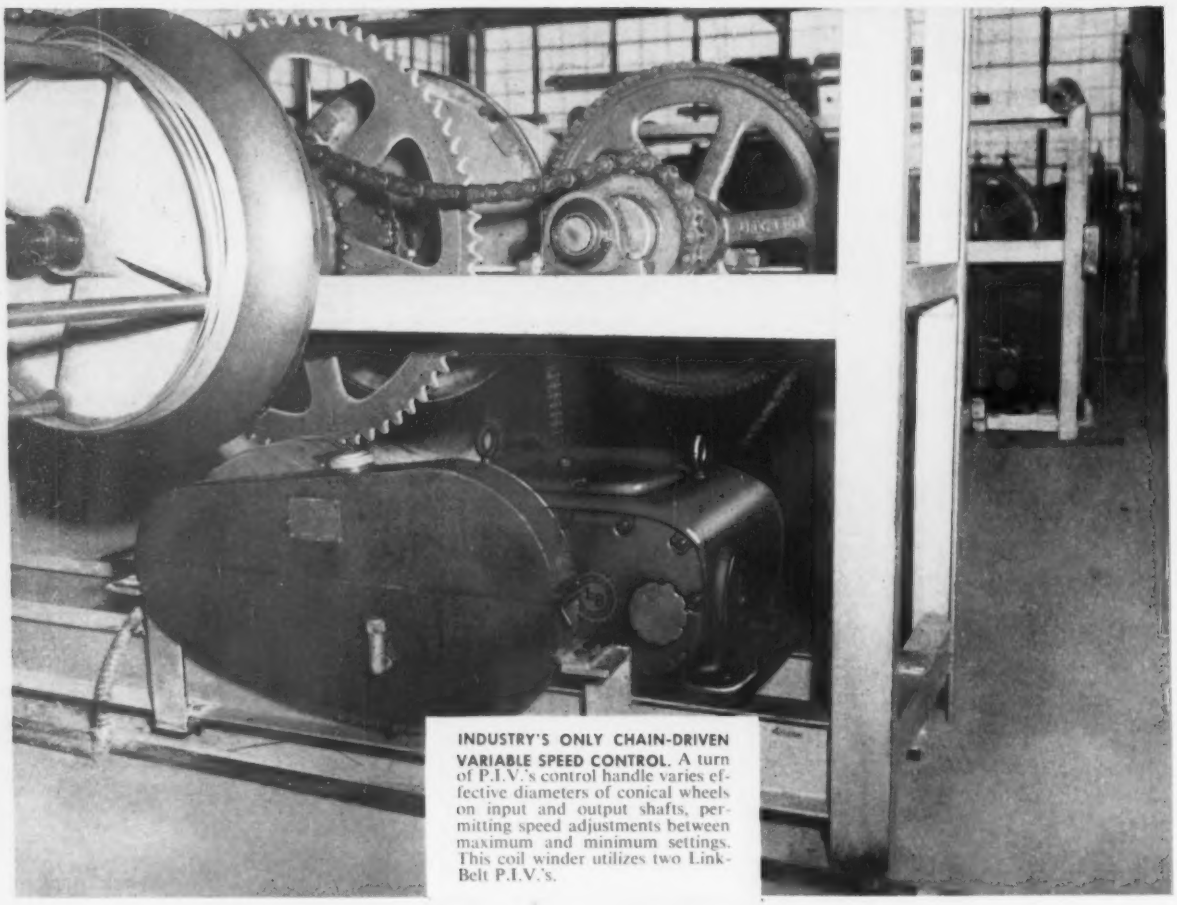


R. T. Brown, appointed manager, Welding Div., Metal & Thermit Corp.

C. D. Gabor, appointed chief engineer, Harbison - Walker Refractories Co., Pittsburgh.



C. E. Ford, named director, marketing, National Carbon Co., Div. of Union Carbide Corp.



INDUSTRY'S ONLY CHAIN-DRIVEN VARIABLE SPEED CONTROL. A turn of P.I.V.'s control handle varies effective diameters of conical wheels on input and output shafts, permitting speed adjustments between maximum and minimum settings. This coil winder utilizes two Link-Belt P.I.V.'s.

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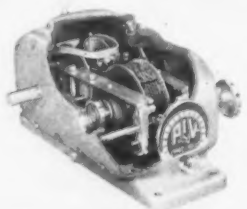

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. . . there's nothing like P.I.V.

Where operations requiring variable speed control can't tolerate slip—no other mechanical drive is equipped for the job like Link-Belt P.I.V. With its all-metal, self-tooth-forming chain that maintains positive grip with radially grooved wheels, it offers a degree of accuracy . . . a level of efficiency—unique in the field. Speeds can be varied in an instant, regardless of load, without interrupting the driven machine. And P.I.V.'s all-metal construction ignores atmospheric conditions.

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(Continued from P. 111)

manager, north eastern district; **D. B. Wiesley,** named general manager, south eastern district; **J. L. Tokich,** becomes director of staff.

Koehring Co.—**E. A. Smith,** appointed director, foreign operations; **V. R. Peterson,** elected secretary.

J. W. Becker, elected a vice president, National - Standard Co. of Canada, Ltd.

Republic Steel Corp. — **G. A. Nemec,** appointed asst. superintendent, blooming mills and the billet mill, Cleveland steel plant.

Harnischfeger Corp. — **Joseph Surmacz,** appointed plant manager, West Milwaukee; **David Drewery,** appointed director, production and industrial engineering; **Robert Over,** appointed superintendent, machine shops.

R. M. Wolcott, appointed asst. director, Production Planning Programs, Jones & Laughlin Steel Corp.

H. M. Hutchison, promoted to coordinator, labor agreements, Personnel Relations Div., Jones & Laughlin Steel Corp.

Pittsburgh Metallurgical Co.—**T. E. Dann,** appointed general superintendent, Charleston, S. C., plant.

The Metals Div., Kelsey-Haynes Co. — **J. G. Ziemann,** appointed chief metallurgist.

Brooks & Perkins, Inc.—**A. T. Hapke,** named director, marketing.

Walter Schmid, named manager, manufacturing-engineering, Alemite and Instrument Div., Stewart-Warner Corp., Chicago.

The National Supply Co.—**J. F. Burley,** appointed superintendent, industrial relations, Torrance, Calif., plant.

Mead-Morrison Div., McKiernan-Terry Corp.—**N. E. Sweet,** ap-

(Continued on P. 116)

News for
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Whether you're building heavy machinery, steel mills, railroad cars, construction equipment or other capital equipment . . . we can save you time, money and production problems with *tailored customer service:*

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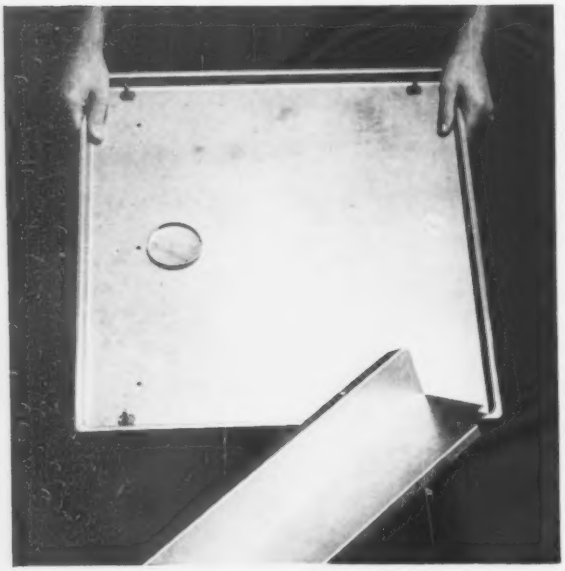

Armco ALUMINIZED STEEL Type 1 Saves $2.50 Per Unit

By switching to ALUMINIZED STEEL Type 1 for various parts of their commercial frying units, a leading restaurant equipment manufacturer cut costs $2.50 on each unit. In addition, the durability of their equipment has been improved by using this hot-dip aluminum-coated steel in place of plated and painted parts.

Because it has resistance to a combination of heat and corrosion, high heat reflectivity and good fabricating properties, Armco ALUMINIZED STEEL Type 1 provides economical durability in applications such as auto mufflers, appliance parts, drying ovens, and heat exchangers.

Armco High Strength Steel Eliminates Wasteful Weight

Armco produces four grades of low alloy high strength steel that enable designers to achieve greater efficiency in the use of material and eliminate costly, burdensome weight. Each grade has high mechanical properties, but corrosion resistance and fabricating characteristics differ to provide steels that most effectively meet individual needs at least cost.

Produced in sheets, strip and plates, the durability and structural efficiency of these Armco Steels make them practical, low-cost materials for railway cars, pressure vessels, truck and tank trailers, and industrial and construction equipment subject to high stresses.

ARMCO STEEL CORPORATION, 3419 Curtis Street, Middletown, Ohio

Send me information on the following Armco Special Steels for these specific applications:_____

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Besides the four steels described, Armco produces a wide range of other special steels that offer you additional opportunities to improve the performance and cut the cost of your products.

These Armco Steels include:

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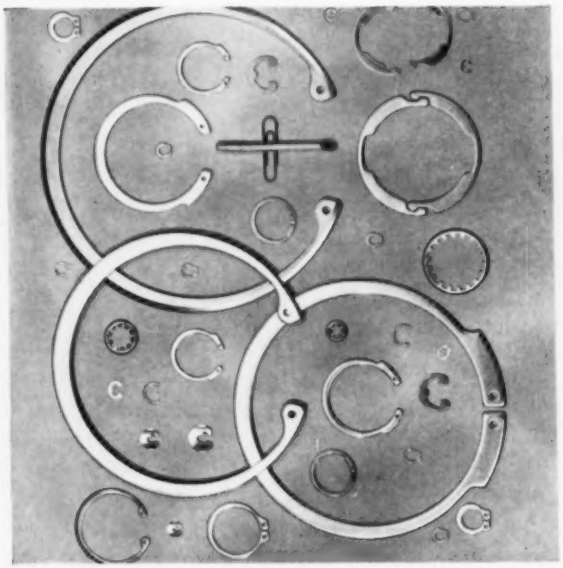
Armco ZINCGRIP Steel	Armco Electrical Steels
Armco ZINCGRIP PAINTGRIP Steel	Armco Welded Steel Tubing

For complete information, just fill out and mail the coupon.

New steels are born at Armco

PRODUCTS...LOWER COSTS



Armco PH 15-7 Mo Stainless Steel Makes a Good Product Better

A leading manufacturer of retaining rings greatly improved the performance of his product and expanded its market by producing a complete line of rings in Armco PH 15-7 Mo Stainless Steel. The ultra-high strength, excellent spring properties, good corrosion resistance, and high temperature characteristics of this special Armco Stainless Steel make possible performance standards heretofore unobtainable at reasonable cost.

This is typical of the results obtained with Armco's Precipitation-Hardening Stainless Steels in diverse uses such as aircraft and missile components; chemical, food, and beverage equipment; and parts of nuclear reactors.

Armco Enameling Iron Cuts Costly Rejects

Made especially for porcelain enameling, this special Armco Steel enables designers to use all the advantages of colorful porcelain enamel and hold production costs to a minimum. The uniformly high quality of Armco Enameling Iron insures against impurities that cause enameling defects. The resistance of Armco Enameling Iron to sagging at firing temperatures keeps critical dimensions within tolerance, simplifies assembly, and improves appearance. Manufacturers of appliances, metal curtain walls, signs, and a wide variety of industrial products, find this special Armco Steel not only cuts manufacturing costs but gives them sales advantages as well.

ARMCO STEEL

Armco Division • Sheffield Division • The National Supply Company • Armco Drainage & Metal Products, Inc. • The Armco International Corporation • Union Wire Rope Corporation

Another H&S Speed Reducer

on a tough job...

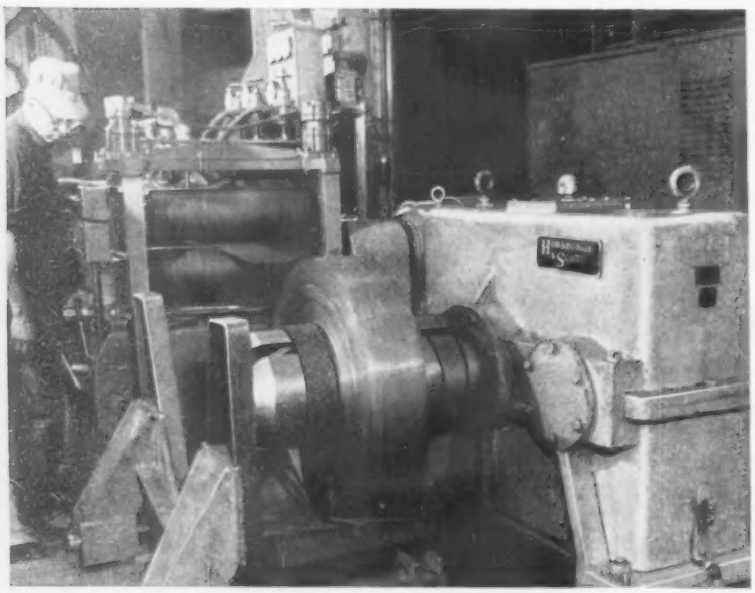
Built rugged for a critical rewind operation, this heavy overhung-load type H & S Herringbone Speed Reducer delivers day-in-day-out service under exacting load conditions.

This standard unit was selected for use on a Bliss precision rewind coiling machine—where strip steel must undergo tension controlled recoiling for subsequent annealing treatment.

Notice the sturdy shaft, with heavy-duty bearings designed to take this heavy overhung load. Observe the rugged housing, made to last.

This built-in toughness typifies H & S construction—on helical, herringbone, worm and combination units.

Send for detailed information on our facilities for producing a complete line of gears and speed reducers in a wide range of sizes and ratings.



Heavily loaded pay-off reel being driven by H & S Speed Reducer in plant of The Acme Steel Company, Chicago.

AGMA

H&S **The HORSBURGH & SCOTT CO.**

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Specializing in fast production of quality Speed Reducers and Gearing to meet custom requirements.

(Continued from P. 113)

pointed western sales manager, Chicago sales office.

Stromberg-Carlson, Div. of General Dynamics Corp.—**C. F. Van Epps,** named director, purchase analysis.

F. S. Wilkins, appointed superintendent, Rod and Wire Dept., Aliquippa Works, Jones & Laughlin Steel Corp.

Bohn Aluminum & Brass Corp. —**A. R. Poore,** appointed director, industrial relations.

Aluminum Co. of America., Equipment Development Div.—**R. G. Hampel,** appointed manager.

The Whitman & Barnes Div., United - Greenfield Corp. — **R. J. Conroy,** appointed asst. sales manager.

Vickers, Inc., Electric Products Div. — **Frank Hynes,** appointed manager, military sales.

Avondale Marine Ways, Inc.— **Ed Neely,** appointed sales engineer, Oil Tools Dept.

Taylor Fibre Co.—**R. C. Clark,** named sales engineer, New England district sales office, Hartford, Conn.

OBITUARIES

J. R. Ewing, 53, a vice president, Gabriel Co.

L. L. Hill, 63, sales engineer, Hyatt Bearings Div., General Motors Corp.

Frank Miller, 51, vice president, Terminal Electronics, Inc.

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100-ton moving down hydraulic Rap frame press for Caterpillar Tractor Co.

Design simplicity, positive and sensitive controls, trouble-free operation —

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Williams-White gap frame presses are bread-and-butter equipment in scores of plants. Production men like their versatility, speed, dependability and economy. Standard sizes, 25, 50, 75, 100, 150 and 200 tons, or built to fit your special requirements as to capacities, opening speeds, daylight, stroke, throat and table dimensions. *Write for Bulletin No. 78.*

106th year

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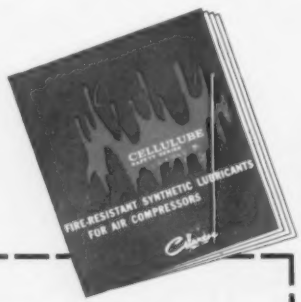
SALES AGENTS: Portland, Ore.: Allied Northwest Machine Tool Corp.; **Los Angeles:** Engen Industrial Co.; **Philadelphia:** Edward A. Lynch Machinery Co.; **Milwaukee:** Pagel Machinery Co.; **Seattle:** Perine Machinery & Supply Co., Inc.; **Chicago:** Polhemus-Miller Co.; **Pittsburgh:** Frank Ryman's Sons; **Cincinnati, Columbus** and **Dayton:** Seifreat-Eistad Machinery Co.; **St. Louis, Kansas City** and **Tulsa:** Robert R. Stephens Machinery Co.; **Buffalo:** H. D. Thweatt Co.

CELANESE CELLULUBES used as air compressor lubricants step up safety in new missile submarines...

The advantages of Celanese Cellulubes were clearly apparent after a test program by Electric Boat Division. The tests included a study of lubricants dispersed in air under high pressure, followed by abrupt decompression. This results in a high-speed shock wave which can cause a violent explosion. Hydrocarbon lubricants proved highly vulnerable, but Cellulubes were so effective in resisting these extreme conditions that they will be used in all compressors in the new Polaris Fleet Ballistic Missile Submarines.

Cellulubes are not only outstanding for the prevention of fire and explosion, they give overall wear protection comparable to that of premium petroleum oils. The resistance of Cellulubes to carbon formation eliminates frequent scraping and cleaning of charred residues from valves and other internal parts of reciprocating compressors. Celanese Cellulubes can reduce maintenance requirements for compressors and often for downstream equipment as well. Celanese Chemical Company, a Division of Celanese Corporation of America, New York 16.

Celanese® Cellulube®



NEW 20-PAGE MANUAL...
shows you the causes of fire and explosion in compressed air systems, based on latest research. This booklet is intended to help plant engineers and management reexamine specifications in the light of the benefits that Cellulube fire-resistant lubricants offer. Send for your copy today.

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A DIVISION OF CELANESE CORPORATION OF AMERICA
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Please send me a copy of your manual on synthetic lubricants for air compressors.

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Company _____

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City _____ Zone _____ State _____

Application I have in mind _____

Factory Mutual-Approved
(Cellulubes 150 and 220)

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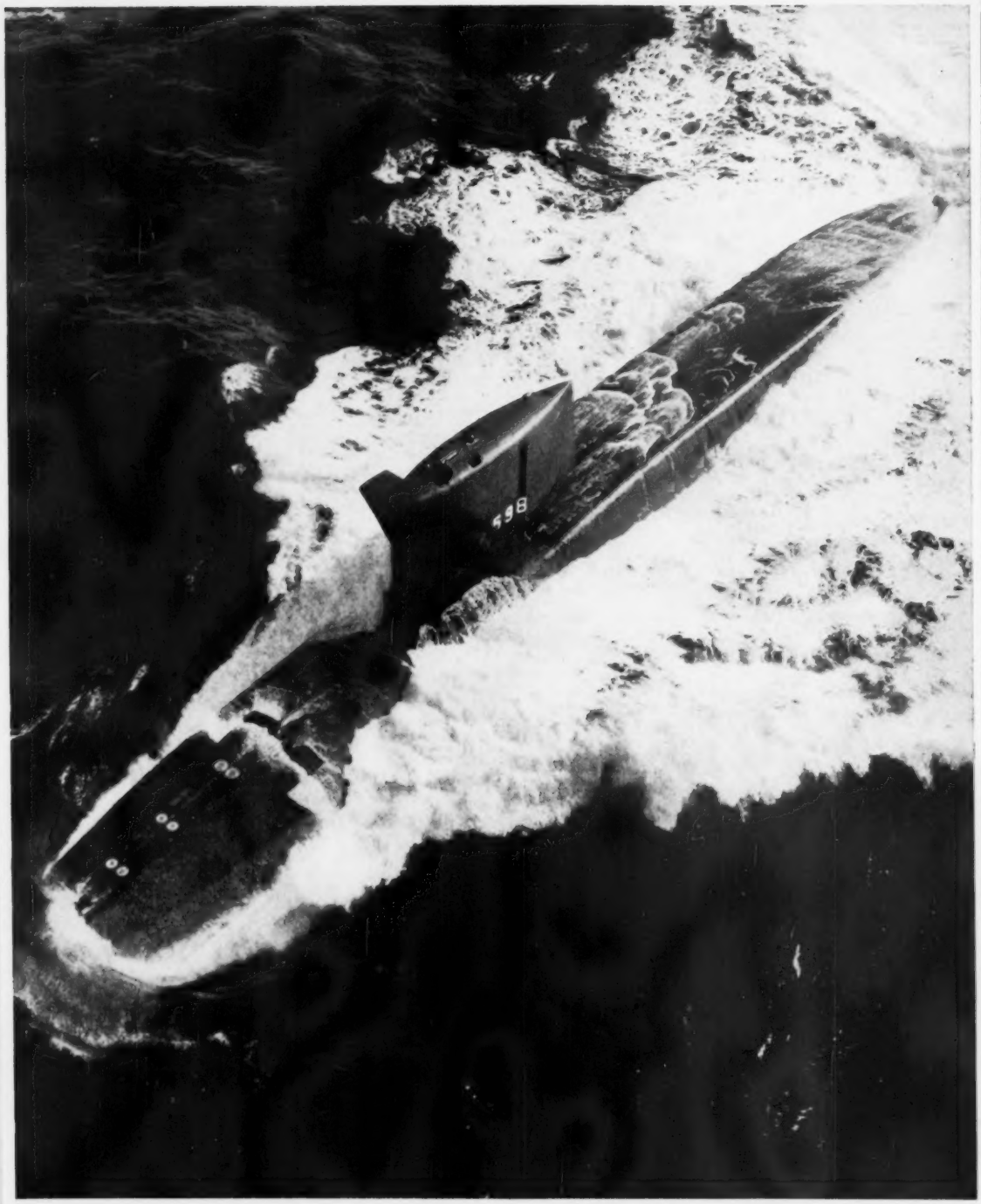

Like all other Polaris Fleet Ballistic Submarines, the U.S.S. GEORGE WASHINGTON uses Cellulube 550 for its air compressors. (Built by Electric Boat Division of General Dynamics Corporation, Groton, Conn.)

Cellulubes... Celanese CHEMICALS fire-resistant functional fluids

In Canada: Canadian Chemical Company Limited, Montreal, Toronto, Vancouver • Export Sales: Amcel Co., Inc., and Pan Amcel Co., Inc., 180 Madison Ave., New York 16, N.Y.

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Every Heppenstall knife is tested for hardness to determine the relative resistance to indentation or displacement of the metal by pressure.

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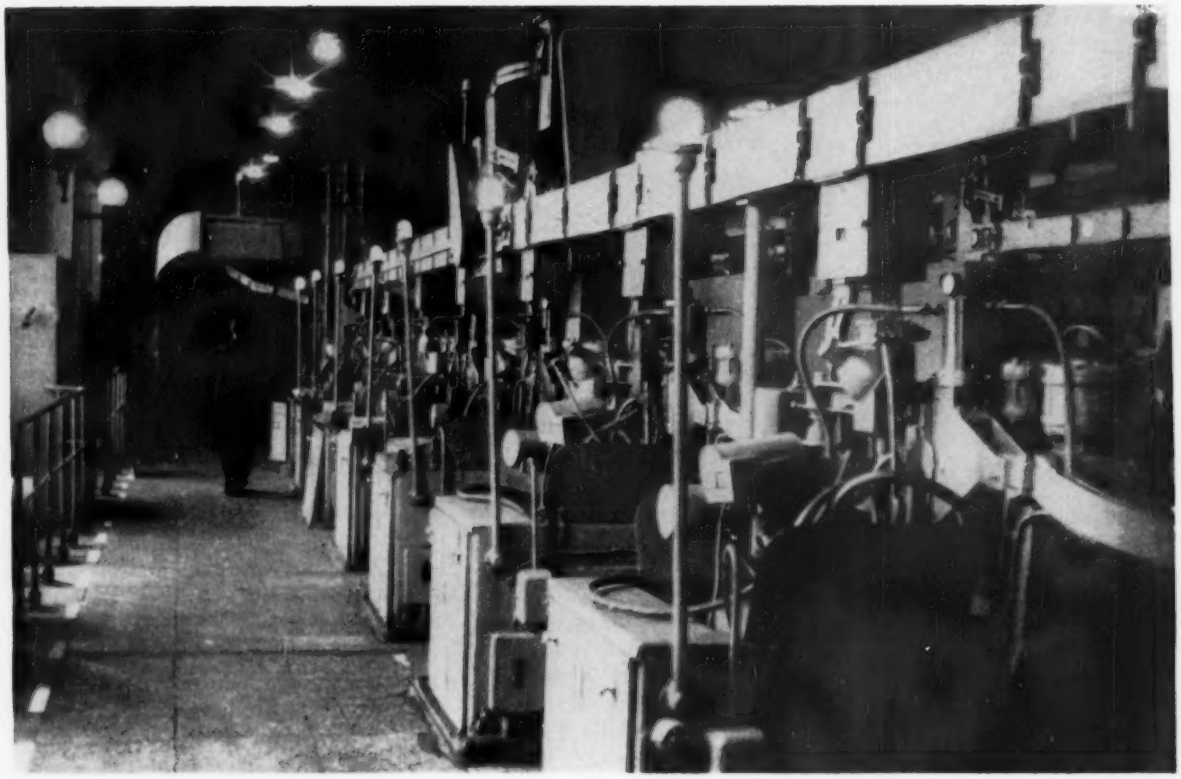


AUTOMATIC PRODUCTION: Individual machines in Moscow bearing factory are linked by enclosed conveyors.

Russian Production Threatens Our Machine Tool Markets

Soviet officials delight in opening their factory doors to qualified visitors from Western nations.

If nothing else, our experts return impressed. Many of them are even alarmed. The reason: Russia's ability to mass produce machine tools.

▪ Western visitors to factories behind the Iron Curtain are sounding the alarm. Will their warnings go unheeded? There is still time to stem the tide. But decisive action from the United States and the entire Western world must come soon.

Two qualified experts, one from the United States and the other from Great Britain, have seen these factories in operation. And one vital fact stands out in their minds. The Soviet Union is the only nation in the world engaged in mass production of machine tools.

No one can deny that machine tools are the basic means of industrial production. What happens to the prestige of one nation when it sells these units on the world market at rock-bottom prices? Uncommitted nations, struggling to build their own industries, will probably find these prices irresistible.

Word of Caution—One of the recent visitors to Soviet industry is Prof. Seymour Melman, Associ-

NEXT WEEK

Research—Russian machine tool production depends on its network of research centers. They will be covered in next week's issue.

ate Professor of Industrial and Management Engineering, Columbia University, New York. He warns that whoever supplies machine tools establishes a network of contacts which may very well result in political influence on a broad scale.

"In my judgment," he continues, "the next years—possibly as few as two—are crucial ones during which Western methods must be decisively improved.

"The target for productivity should be a rise of several hundred percent, and cost and price reductions should be aimed at no less than 33 pct in Western Europe and 50 pct in the United States."

Fantastic Growth—History teaches us a lesson about Russia's ability to further its industrial growth. Its metalworking output, for instance, has increased by 240 times since 1919.

In 1913 Russia contributed only 2.5 pct of the world industrial output. Now it contributes 20 pct—more than France, Britain and Western Germany combined.

Only one nation stands ahead of the Soviet Union in production: The United States. But the Russians have successfully passed many other countries during the past 40 years. Their main goal is now in sight.

A British team of engineers also toured a group of plants behind the Iron Curtain. Spokesman for this team is Dr. D. F. Galloway, Director, Production Engineering Research Assn. of Great Britain. An extensive tour took them through factories in Czechoslovakia and Poland as well as Russia.

Moscow Plant—According to Dr. Galloway, the Krasnii Proletarii plant in Moscow produces chiefly three sizes of standard lathes. This factory is only one of ten lathe-producing plants in Russia. Employing some 5000 workers, the factory turns out about 1000 standard lathes each month, in addition to nearly 40 special purpose lathes.

These standard lathes are said to be the cheapest in the world. The plant makes use of its two fully-automatic transfer lines. A third one to handle the production of stepped shafts is also being installed.

Another plant of interest is the famous Sverdlov Machine Tool Works in Leningrad. Here, boring and milling machines, copy milling machines and semiautomatic milling machines are produced. This plant has just started to produce large jig borers, too.

Grand Prix — These are quality machines. As proof, one of the factory's program-controlled horizontal boring machines won the Grand Prix in its class at the 1958 Brussels World's Fair.

The Soviet Union boasts that by 1970 it will rank first both in physical volume of production and in production per head of population. If the Russians continue to produce at their current rate, these goals will be reached.

Refinements in machine tool design and construction at the Sverdlov works are carried out in the factory's own research lab. Studies cover such areas as machine tool vibration, coordinate setting and continuous path program control, electro-mechanical drives, friction and the elimination of back-lash in lead screws.

Practical Research — Sverdlov's research force often uses 1:5 scale models to study ways to improve dynamic and static rigidity of machine tool elements. Test results from these studies, actually applied, often lead to noted improvements in design.

This research method resulted in an entirely new design of one of Sverdlov's standard machine tools. Engineers increased the overall size of the machine by 25 pct and increased the power by one-third. This was done without adding any weight to the unit.

The research team has developed new machines in its lab. These include several types of numerically - controlled boring machines. Punched cards and dials form the basis of the controls. Many of these studies are performed on a 1:10 scale model of a horizontal borer.

A steplessly-variable electronic feed drive has also been developed for traversing machine tables, head-

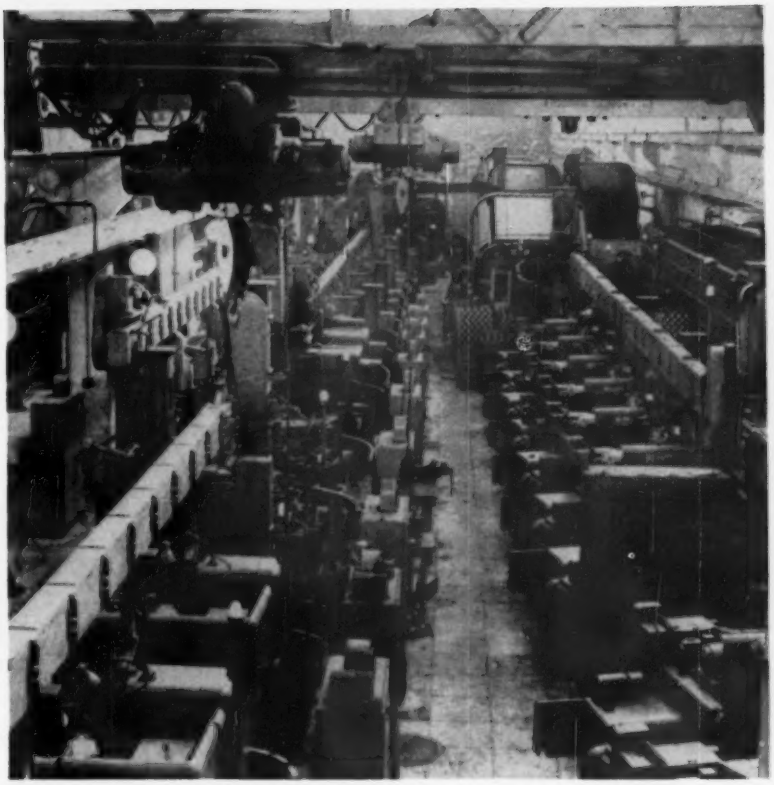
MAKING MACHINES: The Czech plant in Brno is one of the largest milling machine factories in the world. It also makes transfer lines.

stocks and spindles. This drive is equipped with a constant torque electric motor. Motor speeds can be varied from 2 to 3600 rpm to give feed ratios of between 1:1 and 1:1800.

Bearing Output—Moscow is also the site of the First State Ball-Bearing Plant. This factory turns out 70 million bearings per year. In size, they vary from ½ in. to 5 ft OD. And in weight, they range from a single ounce to several tons. The plant employs 12,000 people.

The most unusual feature of the factory is a separate automatic setup for making 4 and 5-in. OD ball bearings. This single subdivision produces two million bearings annually from a total work force of only 30 people (12 production workers and 18 maintenance engineers).

Of course, automation is the key word. The line consists of 150 machine tools, several heat-treating furnaces, special assembly presses, inspection equipment and a unit that greases, wraps and packs the bearings.



MILLIONS OF BEARINGS: The First State Ball-Bearing Plant in Moscow produces about 70 million bearings a year with 12,000 workers.

Seldom Visible—All these setups are connected by enclosed conveyors and many types of handling devices, hoppers and storage magazines. Before balls are assembled with their races, track dimensions of each pair of races are checked.

The correct ball size is automatically selected from 50 different sizes. A set of balls plus the proper size pair of races is then delivered to a press for assembly.

The ability to produce high-quality, low-price machine tools has far-reaching effects. Prof. Melman points out that about 60 pct of the machine tools in use in the United States are at least ten years old. American industry has no choice but to hold on to its old machines. This situation has a depressing effect on American industry.

Comparing Rates—How does a mass-produced Soviet machine compare with a near equivalent Western model? Take the case of a general-purpose lathe. Only 200 manhr are required for the Russians to build this tool. In Western Europe, it would take about 600 manhr.

About 2000 manhr of labor are needed to mass produce one Soviet boring machine. Again, by Western European standards, this same unit requires up to 10,000 manhr to complete. According to Prof. Melman, Soviet production rates are three to four times faster than ours.

How long has the Western world been aware of this Russian goal of world markets? In 1953 the Anglo-American Productivity Council published a report on the machine tool industry prepared by leading British technicians.

This report pointed up the need to reorganize the industry and to revise many practices. Its purpose: To introduce mass production to that industry.

Deaf Ears—The effect of this report has been discouraging. Only the Soviet Union is following the recommendations outlined therein.

Prof. Melman has already submitted a blueprint of ideas to the Director of the European Productivity Agency in Paris. He has suggested that conferences be held to support future moves. And that if private management proves unwilling to go along with such recommendations: Urge governments to intervene. The problem is that serious.

The price war is already being waged. Western Europe is selling a general purpose lathe for $10,000. The Russian figure for a similar model is only $3800. A 27,000-lb horizontal boring mill in Western Europe goes for $46,000. The Soviets get $21,000 for theirs.

Reprints of this article are available as long as the supply lasts. Write Reader Service Dept., The IRON AGE, Chestnut & 56th Sts., Philadelphia 39, Pa.

PRINCIPAL USE: After mixing the fluids supplied by the pumping unit, the air gun sprays the mixture onto the workpiece. The spray dries as a hard plastic coating which has good strength and top homogeneity.

New Unit Mixes Then Sprays Plastic Coating or Foam

Moving at 20,000 rpm, rotor arms—inside a spray gun—mix a metered plastic resin with a catalyst and an air activator.

The mixture emerges through a single volume-controlled nozzle as an integrated spray.

▪ Good design and use of air pressure allow mixing of a plastic resin with a catalyst and an activator — inside a spray gun — just prior to use. Mixing takes place as an internal shaft speeds at 5000 rpm. A planetary gear system moves shaft rotor arms at 20,000 rpm in the mixing area's outer periphery.

The gun can even spray plastics that set within 4 seconds. Such finishes can't be applied by any other means. Thoroughly mixed, the liquids emerge as a single atomized spray; thus spray control is no problem.

Ready Mixture — Made by the Binks Co., Chicago, the device consists of two parts. A pumping unit meters the fluids to the gun: The gun mixes and sprays the plastic coating. Forcing the fluids through highspeed rollers, driven by an air motor, mixes them with no time lag.

Through a single spray nozzle, the gun discharges the uniform mixture. Tests prove that the end product has both good strength and top homogeneity.

Mr. B. B. Roche, president of Binks, states: "The new Binks Turbulator spray gun and Formulator unit make possible for the first time continuous, fast, and efficient spray application of plastics, including polyesters, epoxies, gel-coats, foam-in-place materials, and others."

Older methods of spraying plastic coatings depend on multi-nozzle guns. These guns discharge the resin, catalyst and activator through separate nozzles. Mixing occurs in the air, outside the gun, as an operator directs the separate spray streams toward the workpiece.

Excellent Finish — Another old method of coating consists of hand mixing the liquids; then brushing the mixture on before the plastic can set. Naturally, both of these methods are rather rough. And they require well-trained operators. End results often leave much to be desired.

With the new unit many hard-to-reach workpieces can be sprayed with little effort and no sacrifice in finish quality. Among the uses of the unit are: linings for all kinds of storage tanks; coatings on surfaces such as structural steel, machine tools, buildings, and aircraft, missile and auto parts; and special finishes for swimming pools, furniture, boats and appliances.

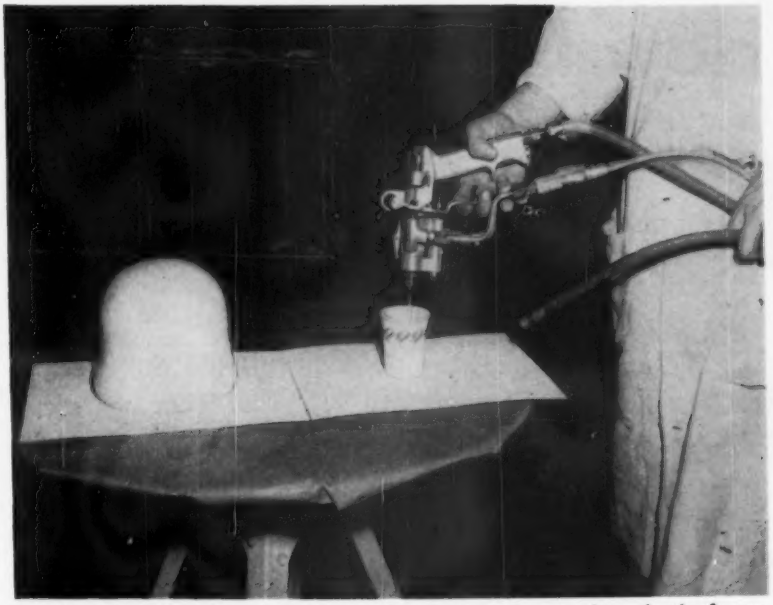
The gun also provides plastic foams for use in thermal insulation, refrigeration and sandwich or cushioning uses. It's easy to spray a foam plastic onto a vertical surface and build up barrier thicknesses to 2 in. or more.

From the Bottom Up—Before, foam plastics were usually premixed and dumped between the vertical surface and an outer form. This was something like cement work. And it sometimes led to trouble. If your plastic started to set too rapidly; then the insulation didn't hit bottom.

Test results indicate the new unit will spray just about the complete range of plastics.

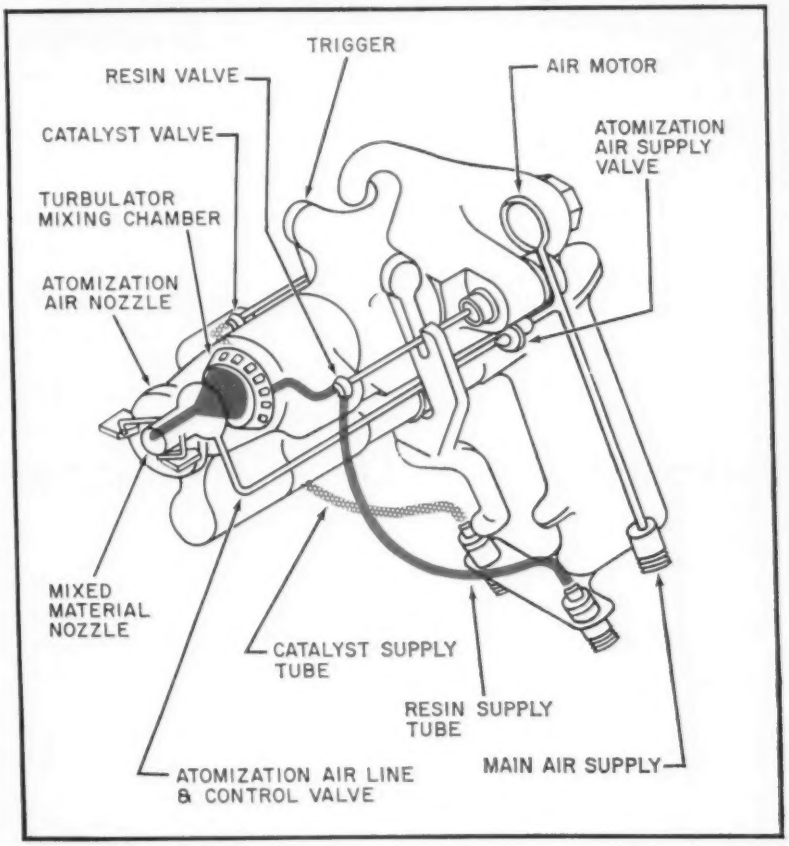
"Now that suitable application equipment has been developed," says Mr. Roche, "we foresee many new uses of plastics. We also predict the emergence of new materials, the development of which has been held back because of lack of suitable application techniques."

Most of the newcomers will fall into the plural component class. Such as those that form when an activator and catalyst come in contact with a base element (such as a plastic resin). Thus, they differ from coatings like paint because they depend on a chemical reaction, instead of drying, to cure or harden.



SPRAYS FOAM: An alternate use for the gun is spraying plastic foams.

How Air Activates Spray Gun



NO TIME LAG: An air motor forces the measured fluids—fed by a pumping unit—through high speed rollers. Mixing takes place with no time lag. This allows the gun to spray finishes that set within 4 seconds.

How New Cast Stainless Alloy Solves Problem Tasks

By E. A. Schaefer—Executive Vice-President, Alloy Casting Institute, Garden City, N. Y.

Claims for a new precipitation-hardening stainless alloy include "high strength linked to corrosion resistance."

First performance figures on cast CD-4MCu parts support these promises.

▪ The trend towards higher temperatures, pressures, and corrosive conditions imposes harsh demands upon both equipment and materials.

In screening present alloys for service under severe corrosion and stress, the designer faces what seems to be an insoluble problem. The 18-8 stainless steels which offer top resistance to attack, cannot be strengthened by heat treatment.

What is needed is a cast alloy which links high strength and good corrosion resistance.

Develop New Alloy — The demand for such an alloy spurred the development of the new casting grade, CD-4MCu (Alloy Casting Institute designation). This alloy combines double the strength of the CF-8 grade (19 pct Cr, 8 pct Ni, 0.09 pct C) with equal or better corrosion resistance.

Other advantages of the new CD-4MCu alloy are: good ductility when hardened; improved resistance to galling; good machinability in both the water quenched and annealed conditions; high weldability with no danger of intergranular corrosion; easily castable using normal foundry techniques.

Easy to Strengthen—The simple heat treatment required to harden and strengthen the new cast alloy is an advantage. Most castings, of normal section thickness, require only a two-step treatment.

First, castings are solution annealed by water quenching from 1950°-2050°F. This develops maximum corrosion resistance. Second, the alloy is aged for three hours in a temperature range of 850°-950°F to achieve a hardness value of 290-320 Bhn.

The alloy has a two-phase austenite-ferrite structure in the as-cast condition. Sigma phase appears in the fully hardened alloy as scattered particles in the ferrite matrix. Comparison of the precipitate after two aging treatments bears out alloy resistance to phase agglomeration.

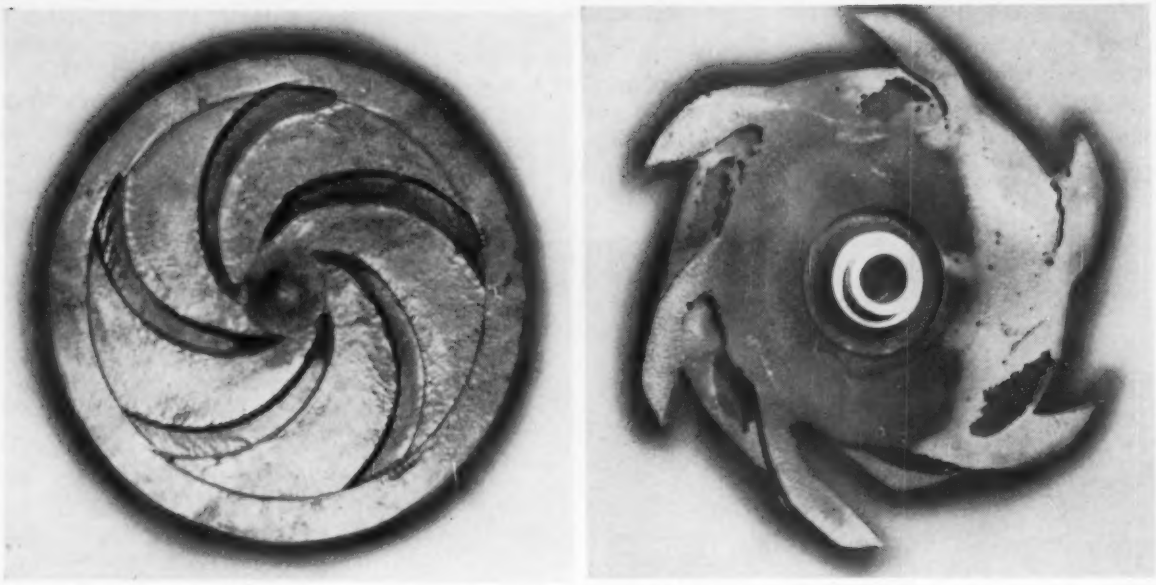
Resists Corrosion — Lab tests point up the high corrosion re-

CD-4MCu Analysis

Element	pct
C	0.040 max.
Mn	1.0 max.
Si	1.0 max.
P	0.04 max.
S	0.04 max.
Cr	25.0 -27.0
Ni	4.75- 6.0
Mo	1.75- 2.25
Cu	2.75- 3.25

Displays Gains Over Predecessor

Type	Heat Treatment	Tensile Strength, 1000 psi	Yield Strength, 2 pct offset, 1000 psi	Elongation, pct	Bhn	Charpy Impact, keyhole, ft-lb
CD-4MCu	Water quenched from 1950°-2050° F	100-115	80-90	20-30	250-270	37
	Aged 3 hours at 850°-950° F	135-145	100-120	10-25	290-320	12
CF-8	Water quenched from 1950°-2050° F	65-85	28-45	35-60	125-150	70



NEW ALLOY HOLDS UP: Impeller of CA-15 (right) shows effects of corrosive solutions after 5 months service. Impeller of CD-4MCu alloy (left), under same conditions, is usable after 17 months.

sistance of the new ACI alloy. By contrast, other precipitation-hardening grades stress high strength rather than a high degree of chemical resistance.

This hardenable grade is far better, for instance, than the widely used CF-8 alloy in 50 pct sulfuric acid at room temperature. Tests run at consecutive 48-hour periods show that there is no tendency for the corrosion rate to increase with time.

The new cast stainless alloy also resists nitric acid solutions. Moreover, iso-corrosion curves show that solution-annealed CD-4MCu stands up to this acid at high temperatures.

Meets Ductility Needs — The table points up the superior properties of CD-4MCu as compared to CF-8. Although the latter alloy has better ductility, elongation values of CD-4MCu are good enough for almost any application. Since fatigue strength increases with tensile strength, CD-4MCu easily resists cycling stresses; the alloy also displays good toughness.

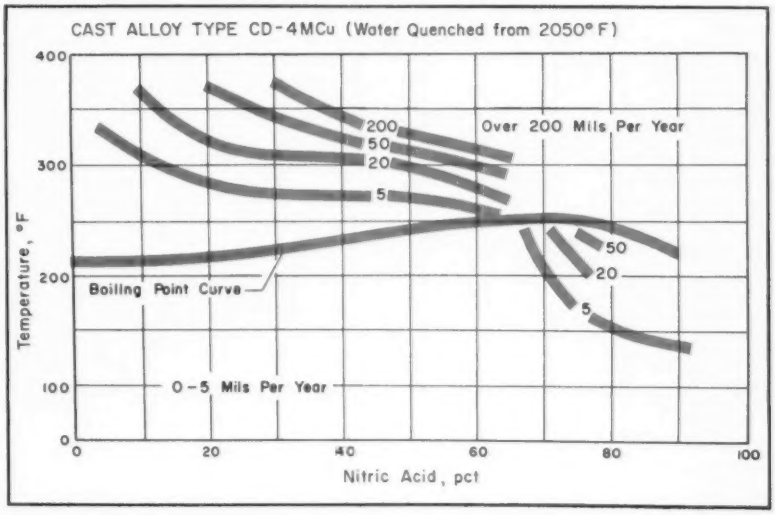
Welding presents no problem. Using filler rods of the same material, electric arc and Heliarc welding of CD-4MCu produces tough and ductile weldments. Preheating and postheating operations are not needed since the alloy does not crack in the heat-affected zone.

For severe corrosive locales, however, re-solution annealing after welding gives best corrosion resistance and control of mechanical properties.

Low Carbon Helps—Because of the alloy's low carbon content, there is no intergranular corrosion due to heavy carbide precipitation during welding. Welded samples reveal a low rate of attack — 10 mils per year in boiling 65 pct nitric acid. There is very slight attack in the heat-affected zone. These results point up alloy fitness for fabrication or shop welding.

How about machinability? CD-4MCu can be readily machined in either the water-quenched or aged

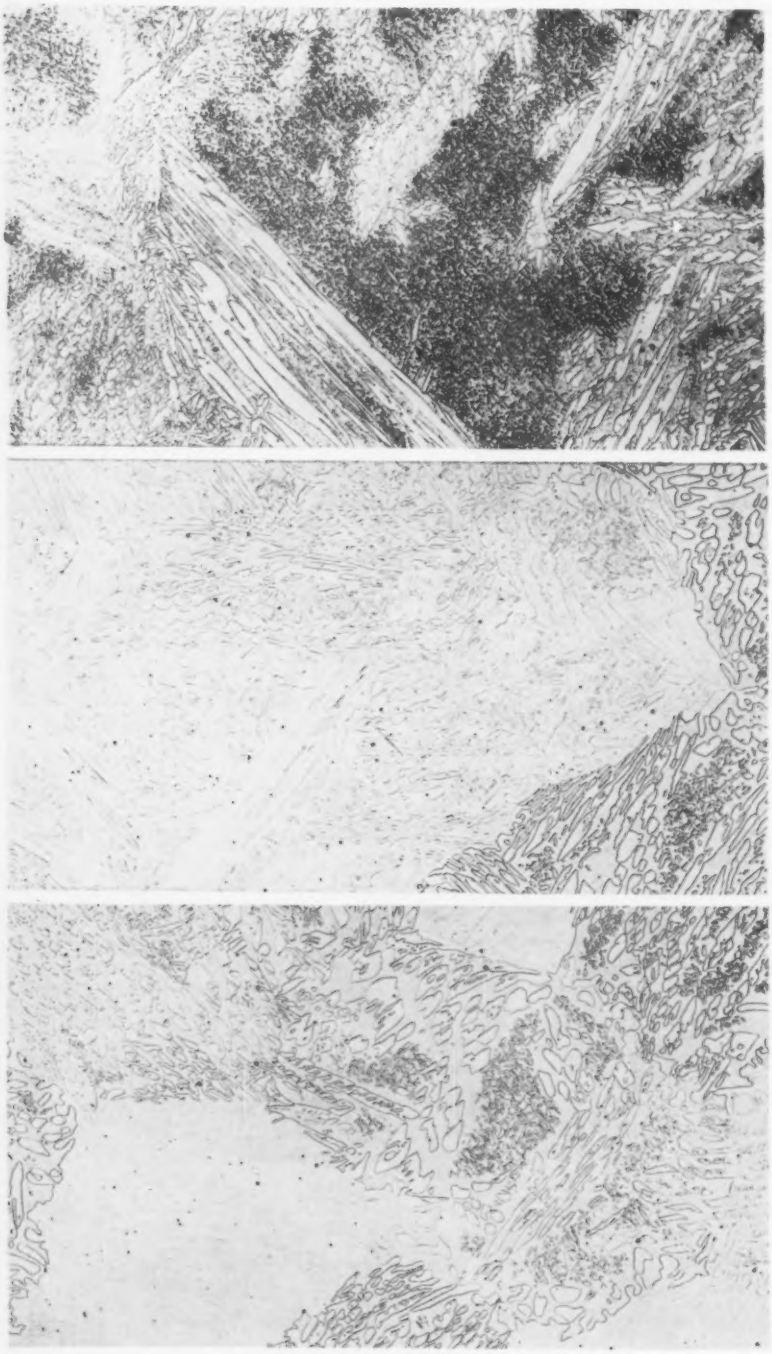
Resists Hot Acid Attack



condition. But, best results are obtained by machining in the solution-annealed condition.

Because the alloy has excellent chip characteristics and does not work-harden, very close tolerances can be maintained.

Takes Punishment — The true measure of an alloy is how well it holds up in service. For example, a pump impeller, in use at Allied Chemical's General Chemical Div., Marcus Hook, Pa., circulates at a high rate of flow in a very corrosive slurry. Temperature is 150°F.



AGING TIMES PLAY ROLE: As-cast CD-4MCu (top) shows an austenite-ferrite structure. Center micrograph is after aging for 1 hour. Bottom micrograph shows finely dispersed precipitate after 4-hour aging.

It is no wonder that even CF-8 alloy, with a well-earned record lasts no longer than 6-9 months. Failure is mainly due to erosion and abrasive wear, with some degree of corrosive attack.

Alerted to the new CD-4MCu alloy, General Chemical engineers installed an impeller cast from this alloy. This was an ideal test for the "high strength linked to corrosion resistance" claim for the new ACI alloy.

Long-Time Service — The impeller ran for 24 hours a day — as did the type CF-8 units. But after 17 months — equivalent to 8½ months of uninterrupted service — the impeller was in fine shape.

Cast CD-4MCu parts are doing a good job for the Alaska Pine Co. Ltd., Vancouver. Included in the wood residue processing line is a violent digester cycle. Forming the heart of the rotary feeder in the digester is a liner which meets brutal corrosive attack.

Exposed to acid liquor fumes, wood acids, abrasive wear, and thermal shock, most materials tested by Alaska Pine failed within six months. But a liner, made of CD-4MCu, is still in service after ten months.

Use for Valves — Another case cites cast CD-4MCu in pump reciprocating valves. Used by Sun Oil Co., Uniontown, Ky., these pumps inject 50 gal of salt water per hour into the ground at 1400 psi.

After handling, 80,000 barrels of brine, the valves show no attack or wear. Original machining marks are still visible on the working faces.

The topnotch performance of CD-4MCu in these few cases suggests its use in many of the basic process industries. Because of the teaming-up of high strength and corrosion resistance, and the excellent results achieved to date, precipitation-hardening CD-4MCu may answer many problems which cannot be solved with existing alloys.

New Heater Brazes Tool Tips

An operator attaches a coil of copper tubing to an electronic induction heater. Using a transformer, he matches the heater output to suit his coil.

Brazing takes place without oxidation of carbide tool tips.

▪ An electronic induction heater brazes carbide tips on router bits and saw teeth. This work is a one-shot process. Reworking of the tool cutting edges used to be a major problem. Now, this headache is a thing of the past.

Use of a variable coupling output transformer matches the heater to any copper coil. Naturally, this beats designing and building a special output coil—to meet the fixed output of the heater.

"With our GE induction heater we've increased the production capacity of our brazing operations by 30 pct because it replaced a basically manual operation, and greatly improved the quality of our products," says Mr. V. G. Bryson, manager, Virginia Machine Tool Co., Bassett, Va.

Multifarious Tools — The company makes custom-made tools to meet special needs of the woodworking industry. Products range from small bits—for making hairlike lines in furniture—to large-size heads with intricate knives and cutters.

In the past, carbide tips were brazed to the bits and the saw teeth through heat from an oxyacetylene torch. The torch was fitted with different-sized nozzles. It was almost impossible to get uniform brazing heat over the entire working area; thus the work quality was uneven.

Varied coefficients of expansion in the steel and the carbide result in high stresses. These stresses cause the eventual cracking of the carbide tips.

Quality Improves—"Since we began using this electronic induction heater, our product quality has been greatly improved, eliminating rejects and reworking of tips," says Mr. Bryson. "We tip about 225 saws per month (averaging 65 teeth each), about 200 router bits per year, and any other cutting tool we manufacturer. The heater is also used for annealing the shanks of slotted molder knives used for making furniture samples."

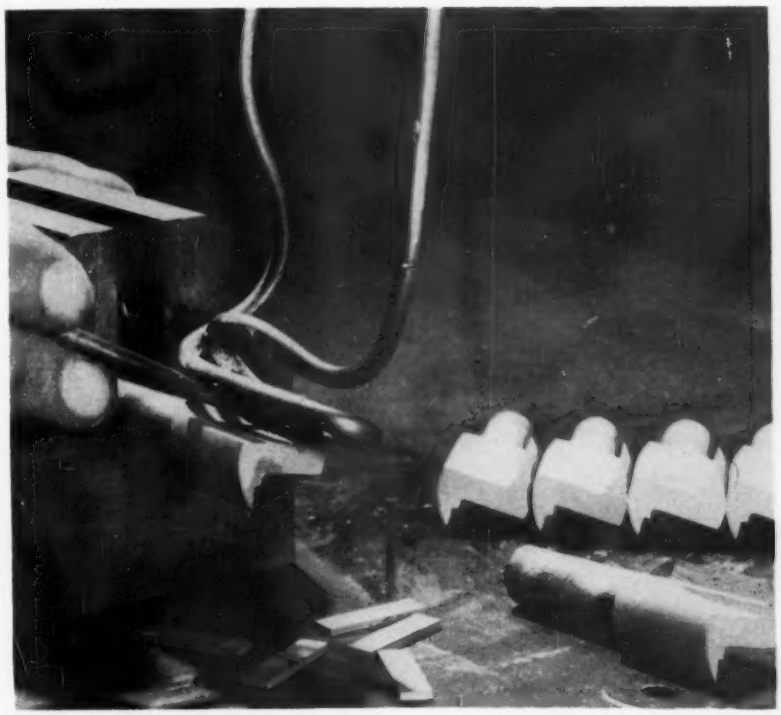
With the torch, brazing was strictly a hand operation. Each tooth was soldered separately. Then, the teeth were fluxed and the carbide tips were applied.

The tip was placed against the tooth and the torch was applied directly to the carbide. This brought the tooth to a visual temperature of 1100°F. The heat was held for at least 30 seconds before the torch was removed.

Over in 45 Seconds—Using the induction heater, an operator now completes the brazing cycle in about 45 seconds. He places the saw blade on a jig. This positions an anvil under the saw teeth. Then, the operator applies flux to the teeth and attaches a loop of copper tubing to the heater.

He brings the heater to a tooth and places the carbide tip against the tooth. The tip rests on the anvil.

The operator turns on the heater. The unit reaches working heat within 25 seconds. After the heat is held for 10 seconds, the unit is turned off. The tooth is allowed to cool for 10 seconds; then the operator moves the saw to the next tooth position.



BEND TO SUIT: Carbide tips are brazed to router bits with ease. A piece of 3/16-in. diam copper tubing is bent to the desired shape. The heater brings the copper-tube to working heat in about 25 seconds.

Hydraulic Design Upgrades Automatic Bar Machine

By **James Ockuly**—Sales Engineer, Wyatt Sales Corp., Cleveland

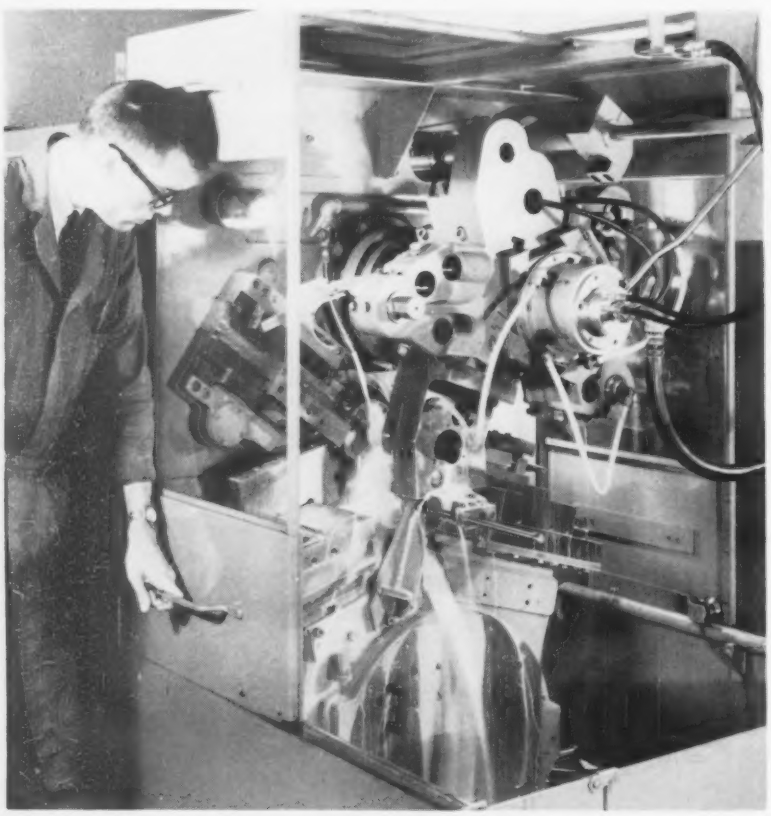
Here's a case where fluids and coolants couldn't be introduced by mechanical means.

But two special designs in hydraulics gave the machine the smooth action needed.

▪ The problem at Warner & Swasey Co., Cleveland, was one of engineering. The company wanted to give its new 2AB automatic bar machine as much versatility as possible.

First, they added a novel bar turner for use on the single-spindle machine. This device automatically retracts the cutter to eliminate tool withdrawal marks. Then a cam was mounted on the framework of the machine. The cam resets the bar turner (in an off-index position) while the turret feeds forward to the next machining station.

However, one or more self-opening dieheads may also be mounted on the other four tooling stations. These tools must also be reset. But any cams used to reset the dieheads would interfere with the bar turner resetting cam. This made it impossible to use mechanical means for resetting both bar turners and dieheads.



HYDRAULIC HELP: To get the most out of a bar machine, a new cylinder was designed to close the diehead hydraulically. To bring the fluid to the cylinder, a special distributor gland was also designed.

Why Not Hydraulics?—Warner & Swasey engineers then began thinking in non-mechanical terms. Why not close the diehead hydraulically? It was at this point that Airmatic Valve, Inc., Cleveland, moved into the picture.

The valve company designed a special hydraulic cylinder with a nonrotating rod. The cylinder was mounted on the same tooling station as the diehead. There's a cam on the end of the cylinder piston rod that moves the diehead lever forward and radially to reset the diehead.

But then how do you bring the hydraulic fluid to the cylinder? Hoses were out of the question. They couldn't be brought directly to the cylinder. Why not? Because the cylinder is mounted on an indexed tooling station.

New Gland—So more design was needed. Airmatic Valve solved this problem by designing a special distributor gland. And they mounted it in the center of the turret.

The gland has two functions. First, it acts as a rotary manifold to distribute the hydraulic fluid. The fluid, in turn, runs the cylinder that resets the diehead.

The other feature provides coolant distribution to the tooling stations on the turret (which is in the cutting position.) O-rings prevent hydraulic fluid and coolant from leaking or mixing with each other.

Double Purpose—The bar machine has a hydraulically-operated bar feed and collet chuck. The machine is so designed that the same oil can be used not only to lubricate but to provide hydraulic power

as well. It's a general purpose, nonfoaming, mineral oil of turbine quality.

The machine's hydraulic pump has a capacity of 500 psi. While the unit is cutting, a solenoid-operated relief valve reduces pressure to 125 psi. At this point, oil feeds out to a spray ring in the headstock and into the hydraulically-operated speed and feed clutches.

As soon as a machining cycle ends, the solenoid cuts out the relief valve. For an instant, the valve is bypassed. Meanwhile, full pressure is applied to the collet chuck and to the device that runs the bar feed.

Perfect Timing—The hydraulic lines to and from the distributor gland are part of the same system. As a result, the diehead is reset at the same time the collet opens and closes.

There's no pressure in the hydraulic system while the machine is cutting. Nor is there any pressure in the hydraulic system of the distributor gland. However, the coolant flowing through the gland does have a pressure of 15 psi.

During the time that the diehead-resetting valve is running, pressure in the distributor mounts to 500 psi. That means that the O-rings are sealing under adverse conditions. Airmatic uses only O-rings that check within 0.003 in. of the standard dimension. Such sizes prevent coolant or minute chips from entering hydraulic lines.

How Coolant Flows — Coolant only flows to the station which is cutting, thanks to gland design. The gland itself is made of two parts. One is a nonrotating cast bronze insert. The other is a rotating body of cast aluminum. A rod (riding in a channel on the framework of the machine) prevents the insert from rotating.

Coolant enters the distributor gland through an axial hole drilled in the center of the insert. A single channel delivers the coolant to one of the five coolant passages in the outer body.

Hydraulic fluid pressure can be applied to all five tooling stations at the same time. How? Each of the two holes for hydraulic-line connections leads to a separate groove. And each groove is cut ¼ in. deep around the insert.

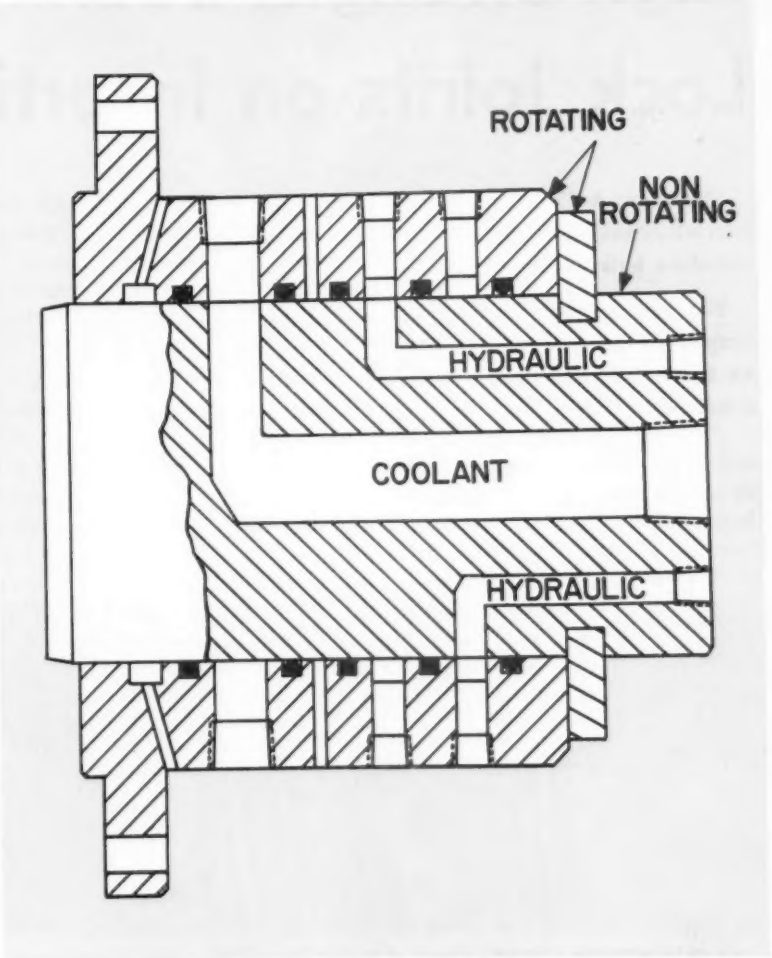
The grooves thus provide fluid to all holes drilled through the rotating part of the gland. Those not needed can be closed by a plug. Suppose more than one tool has to be reset. Then just remove the proper plugs and connect hoses from the gland to a resetting cylinder mounted on the tooling station.

Smooth Action — The cylinder that resets the diehead has a 2½-in. stroke. For smooth action, the stainless-steel piston is ground to an 8 or 10-microinch finish. It's then chrome plated and polished to a mirror finish.

The piston rod is kept from rotating in the cylinder by an unusual construction that gives added strength. You see, the back gland of the cylinder is brazed to a hexagonal rod.

The rear end of the hollow piston has a similarly-shaped hole. And it slides over the hexagonal rod. This keeps the piston rod from turning. It also does away with keyways or other weakening elements from the piston rod itself.

How Fluid and Coolant Enter



SPECIAL GLAND: Outer part of distributor gland turns around the inner cylinder as turret indexes. Center part remains stationary.

High-Strength Bearing Bolts Lock Joints on Insertion

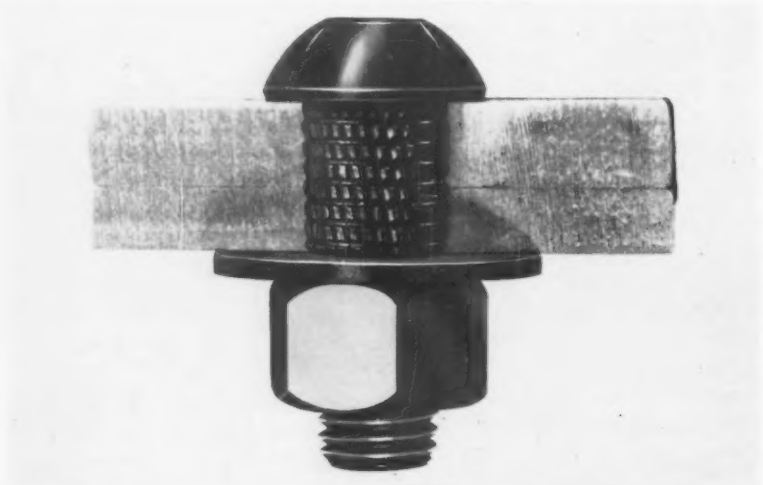
Structural bolts with rows of knurled shanks prevent slippage —before nuts are applied.

The front of each knurl is ball-shaped for easy driving. Reliefs on the knurls lock the joints in a hooking action.

▪ Rows of spiral grooves on the upper shank of a new structural bolt produce a tight body-bound fit. The tight fit insures high shear resistance. After a bolt is driven through connecting steel beams or joints, the "fit" locks the assembly to prevent slippage—even before a nut is applied. Here's how.

Each bolt shank has rows of knurls set on a spiral to reduce the driving load. Length of the knurled body is determined by the thickness of the members to be joined. The front of each knurl is ball-shaped: This also allows easy driving.

COLD WORKED STEEL: Rows of knurls engage the joint material with rounded grooves. This action produces cold working to offset notch effects.



BOLT DIGS IN: Spiral Grooves on bolt shanks produce a body-bound fit.

Relief Locks Beams — Between each row of knurls there's a relief which serves two purposes. It prevents packing of foreign or displaced matter during driving; thus making driving still easier. And, the rows of reliefs act as a buttress after impaling the connected joints in a hooking action.

Bolt heads resemble upset rivet heads—except for small flats across their tops. The flats permit driving with an impact tool or a hammer: This reduces head clearance needs. Diameters of the buttonheads on the new High-Strength Bearing Bolts, made by the Lamson & Sessions Co., Cleveland, equal the bearing surfaces of standard high-strength bolts with washers.

Knurls on the new bolts aren't continuous. During the driving process the rows of knurls engage the joint material with rounded grooves. This action produces cold working inside the hole to offset any notch effect caused by the grooves. The back (relief) faces of the knurls provide the hooking action.

Good Bearing Surfaces — The lower end of the L & S bolt shank has national standard coarse threads. Bolt length allows room for a washer under the nut. Washers under the bolt head aren't needed due to the head's wide bearing surface. Nuts, bolts and washers all conform to ASTM Specification A325-58T.

Loading torque induces a clamping pressure on the joint through friction between the connected beams. The resulting friction resists slipping of the connected members

on themselves. Thus, the friction —coupled with the hooking action of the knurl reliefs—does away with all slippage, under normal conditions.

Elimination of slippage is important to architects and engineers. Fabricators are also interested because this solves paint removal problems which occur if slipping takes place. Such slippage is common if standard bolts aren't torqued properly.

In erecting with standard high-tensile bolts, nuts are sometimes jacked a few times with a wrench to keep a beam from slipping until the impacting crew tightens the nuts. Use of the new bolt eliminates this partial hand tightening which saves a lot of time.

Search for Ideal Fastener—Since the advent of steel frame skyscrapers and long-span steel bridges, engineers have hoped for an ideal fastener. Optimum requirements include: high resistance to shear loads—imposed by beam slippage; prevention of slippage; low-cost installation; and overall dependability.

For years hot-driven rivets joined most steel structures. A crew of four men performed the riveting operations. Naturally, industry considered this a waste of manpower. And the riveting noise was unwelcome. But, rivet shear was even more unwelcome.

With the L & S bearing bolts the greater portion of any structural load is transferred by friction —not by shear. Tests prove that the bearing bolts have higher shear and bearing values than standard high-strength bolts or rivets.

High Static and Fatigue Loads—The new bolts also exhibit greater strength than Dardelet Rivet Bolts. An illustrated comparison table gives basic data at a glance. The L & S bolts give greater slip resistance than all standard structural fasteners in both static and fatigue tests.

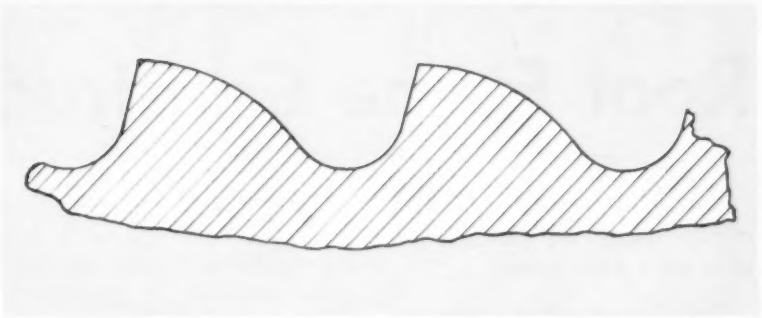
At least two workmen are needed to impact the usual high-tensile bolt. One man secures the bolt head while the other turns the nut to pull in the bolt. A single workman can handle the new bearing bolts.

Field erection tests show that men with little experience can place 350 bolts per man for each 8-hr shift. This time doesn't include impacting. Nut impacting is handled by a one-man crew.

In a research report on the L & S bolts, Prof. W. H. Munse, University of Illinois, states: ". . . little or no slip occurred in the connections under tensile loading of 30,000 psi on the net section. This, however, should be expected since the hook knurl is initially in bearing and cannot slip."

Prof. Munse also reports that the torque necessary to obtain a tension of 29,000 lb in the bearing bolts is slightly lower than that required for the same tension in a regular high-tensile bolt.

Here's the Knurl Pattern



HOOK KNURL: Frontal ball shapes make driving easy. The back face is relieved like a drill or tap to prevent packing of displaced material.

Compare Structural Fasteners

	DARDELET RIVET BOLT	HIGH-STRENGTH BOLT	HIGH-STRENGTH BEARING BOLT
ASTM designation	none	A 325	A 325
Comparative shear strength, pct	100	159	177
Tensile strength, psi	70,000	90,000 to 120,000	90,000 to 120,000
Resistance to slippage	good	fair	excellent
Resistance to vibration	good	good	excellent
Men required to install	one	two	one
Equipment required	sledge and hand wrench	impacter and hand wrench	maul and impact wrench
Installation cost	equal to or less than rivets	less than rivets	less than rivets
Washers required	none	two	one

Production-Line Methods Speed Roof Frame Construction

A steelwork contractor runs a huge roof frame through the shop via a production line.

Field erection becomes an easy operation. The modules are joined at roof-top level.

▪ Production-line methods enable rapid assembly and erection of one of the world's largest space frames. Weighing 1200 tons, the steel frame crowns a 450-sq ft office building, nearing completion in Kalamazoo, Mich.

All parts of the space frame can be used to their fullest extent. Compression members are short; therefore compression stresses can be high. Tension members also withstand high loads.

A complete model was set up near the building site. And, prior to actual construction, every critical joint of the model was tested.

Requires 150,000 Angles — In bidding for the steelwork contract, Whitehead & Kales, Detroit, had an idea: They would run the entire roof through their shop on a production-line basis. Here's how they did the work.

The roof needs over 150,000 4-ft lengths of various sized angles. These angles form pyramid corners. Another 15,000 varying lengths of steel tees form the horizontal frame.

Considering production ideas along with shipping and erection problems, W & K settled on making over 200 trapezoidal, triangular and parallelogram sections. They ship these parts to the job site for on-the-spot (roof-top) assembly.

Each truck shipment holds two or three space frame sections. Beams and columns—to obtain full weight per load—fill in the shipments.

Models Aid Assembly — A full scale wood model of a frame roof section was built in the shop to study all angles, clearances, weld points and welding techniques. Following this, more wood models were made of welding and assembly fixtures. As a direct result, jigs and fixtures came into being.

The jigs and fixtures hold tolerances to 0.01 in. This is fairly tight when compared to normal structural tolerances. The tight tolerances allow the job to go well in the field. Reaming and fitting problems, which often normally crop up, haven't been encountered.

Structural tees, used as horizontal members of each frame section, are slit from wide flange beams—rather than purchased as mill shapes. A punch press, tooled with rectangular punches and an automatic spacing table, slices the beams.

Makes Shipping Easy — As a beam indexes through the press, a series of slugs down the beam center are knocked out. At intervals, no slug is removed; thus the two resulting tees aren't completely separated.

The sections are later sawed and the tees cut to length. In fixed lengths, they serve as the chords of

ERECTION SITE: To complete the pattern, the crane operator raises short sections and lowers them between the cantilevered ends of sections already in position. Later, the falsework beams will be removed.

the upper and lower frame grids.

Two types of jigs, grid subassembly and final assembly types, are used for welding the space frame sections.

The grid jigs position the tees for assembling the top and bottom grids. Connector plates are positioned and welded in these jigs.

Lock in Position—Locking devices hold the top grid in its exact relationship to the bottom grid. Diagonal running angles, between the top and bottom grids, are tacked in place. Down-hand welds are then performed on the assembly.

A hoist rolls the partially welded section over and into a cradle. Here, the balance of the welding takes place.

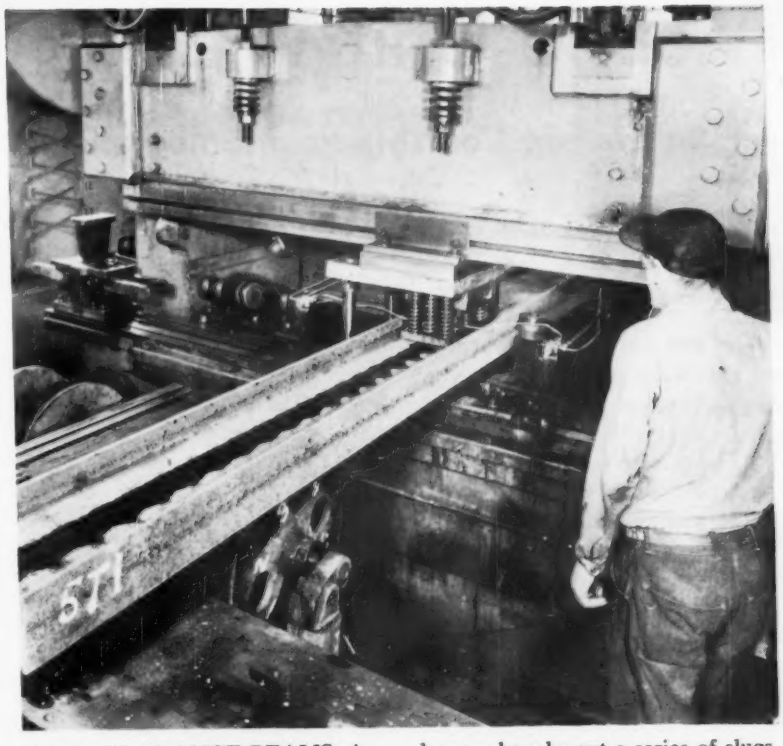
Completed frame sections pass through the paint shop. Then, they enter a storage yard to await shipment.

Use Falsework Beams—At the job site, W & K use a table-top erection method. This insures perfect alignment of the various sections. The method consists of a series of falsework beams, bolted to roof supporting columns, for temporary alignment and general positioning.

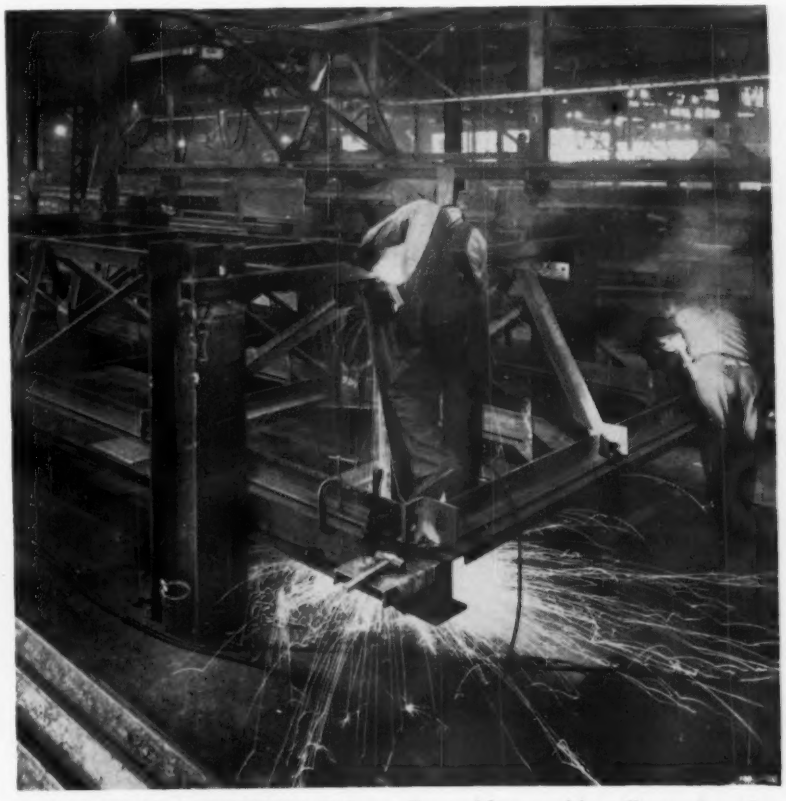
A series of frame sections are placed side by side on the beams. Diagonal members join the sections together. The diagonals are already attached to the top chord of one section; thus they're ready to pivot down to meet the bottom chord of the next section.

Long space frame sections are next joined. Suspended sections are raised into position between cantilever ends to complete the pattern. Removal of the falsework beams takes place after completion of the roof over one bay. Workmen merely slide the beams over to the next bay.

A new type of expansion joint is employed in the end-to-end sections. Instead of the usual bolt-in-hand, this joint uses a square bar that slides in a slot. The bolt fits into the bar, rather than into the slot; thus it eliminates single point contact.



PREPARE FLANGE BEAMS: A punch press knocks out a series of slugs. It leaves small sections at intervals. This method speeds handling.



FINAL SHOP ASSEMBLY: Using a jig, welders position diagonal angles to the top and bottom grid sections. These angles are welded in place.

Mobile Unit Welds Tanks Faster

Single Station Controls Positioning and Welding

Tank fabrication lends itself to custom-designed automatic arcwelding systems.

This one carries the operator to the work—in any direction and up to 14 ft in the air.

▪ As soon as production begins to lag behind sales booked, it's time for an overhaul of plant methods. A major tank builder, The Bishopric Products Co., Cincinnati, launched a five-point expansion program to ease its bottleneck problem.

Management first turned to a central compressed air system, serving all production areas. It then relocated certain departments and also expanded its existing coating plant. In a fourth step, the entire railroad yard received a concrete surface to ease material handling chores.

But the most vital improvement of all is the company's new automatic welding setup. Formerly, welding was done in a set location. All work had to be moved to this area. Now welding moves to the work. The new system is flexible enough to make welds anywhere within an area measuring 24 x 80 ft.

Rides the Boom — The welding operator is now in a cockpit, right next to the welding head. Both are mounted on a free-swinging boom supported by a vertical column. The column can rotate 360° as it moves along its 80-ft track. It's also designed to make welds at heights up to 14 ft above the lowest head position.

The machine was designed and built by Pandjiris Weldment Co., St. Louis. Pandjiris consulted with engineers from Bishopric and Hobart Brothers Co., Troy, Ohio, before laying the final plans. Hobart supplied the welding head, controls and constant voltage power source.

This new found mobility puts the machine to work most of the time. It does not sit idle pending the completion of any one setup. Also, the 900-amp welding source prompts rapid deposition of weld metal, up to 100 ipm. This speed helps discourage warpage in the weldment.

Control Tower — The operator controls welding voltage, wire feed speed, boom travel speed and dolly travel speed from his cockpit.

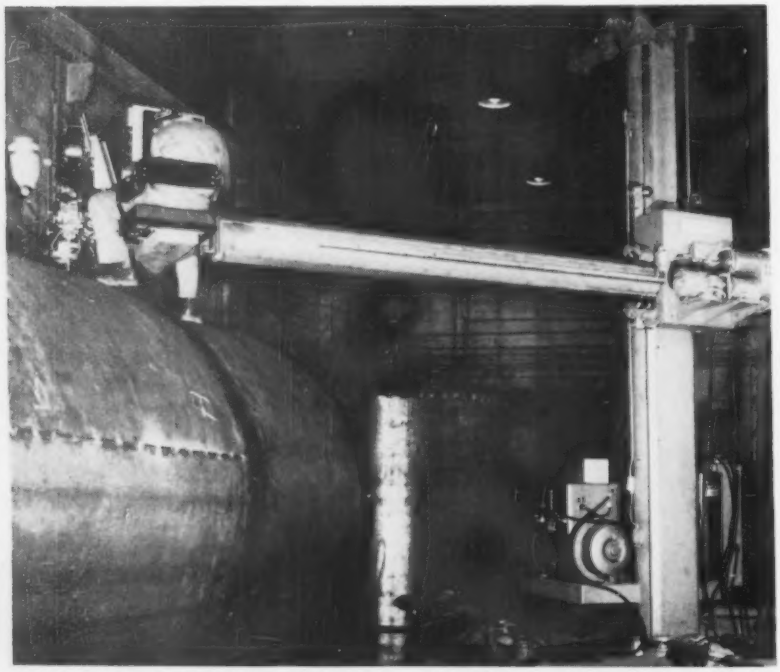
The constant voltage welder is on the dolly that moves along the base of the track. Hence, it travels along the track with the column and the boom.

In addition, all control cables to the operator's cockpit pass through the boom tube. This feature eliminates the shifting of heavy cables, thereby insuring faster movement of parts.

Problem Solved—The new welding setup has resulted in more business for Bishopric, not only in tank fabricating but in its "Lastiglas" tank lining facilities as well. Most of Bishopric's business is done with brewing, wine and chemical processing industries.

What does it mean to production? Bishopric can now put 34 brewery tanks in one stage or another of production. Under the old setup, the company could only handle half that many at one time. These particular tanks are 12 ft 3 in. in diam and 16 to 18 ft long.

The overall result spells twice as much tank production on the same amount of floor space. In addition, welding time on all tanks has been reduced from one-third to one-half, depending on the type of weld.

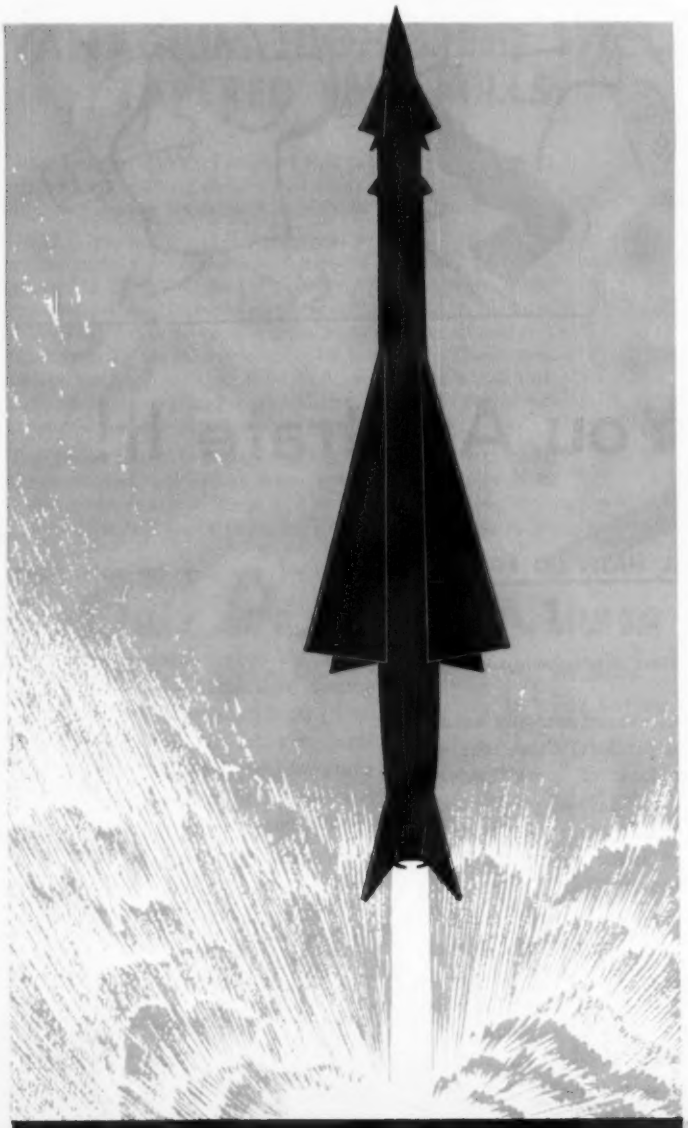


ON TOP OF EVERY WELD: Custom-designed arcwelding setup enables operator to control welding sequence anywhere within 1920 sq ft area. Welding and positioning controls are located in operator's cockpit.

MEETS EVERY TEST...

BEFORE AND AFTER COUNTDOWN

Acme-Newport Steel



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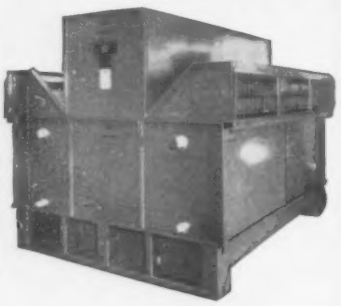
Acme-Newport Steel COMPANY

NEWPORT, KENTUCKY

A SUBSIDIARY OF ACME STEEL COMPANY



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- **Because the new design improves the heat transfer to the out-door air by evaporation.**
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- **Because you save 95% of cooling water cost.**

You get faster, more accurate cooling of industrial fluids to specified temperatures.

You improve your quality of production by removing heat at the rate of input.

You save labor in upkeep. With full access to all interior parts and piping you see everything in easy inspections. You head off dirt accumulation and corrosion. Casing panels are removable without moving the coils. The coils can be cleaned from both sides.

First cost is low; freight is low because of the lowest space/weight ratio; you save much labor in erection. Capacity range is 7,000,000 to 18,000,000 Btu/hr. No other heat exchange method gives you so much saving in money and convenience.

Write for Niagara Bulletin No. 132

NIAGARA BLOWER COMPANY
Dept. IA-3, 405 Lexington Ave.
NEW YORK 17, N. Y.
District Engineers in Principal Cities of U. S. and Canada

You Arbitrate It!

HELL HATH NO FURY

From the files of
The American Arbitration Association

■ Helen C., one of five spot welders in a metal products shop, was sent home for lack of work early in March 1958. That was proper under the contract because she had less seniority than the other girls in her classification.

While she was on layoff work picked up for the other classifications in the department; some overtime was necessary. The spot welders still didn't have too much to do, but management decided that as long as the others were going to work an hour overtime for four days, it would be good for morale to let the four spot welders work late along with them.

"You Arbitrate It!" appears in the second issue of The IRON AGE each month. Look for it in the April 14 issue.

Claims Four Days—When Helen found out about it, she was furious. She filed a grievance: "I should have been recalled from layoff before other spot welders were permitted to work overtime," she said. "Now you owe me pay for those four days."

"Under other circumstances you would be right," answered the personnel manager. "But we didn't really need the spot welders on overtime. We let them work because everyone else in the department was working. You didn't lose anything by the extra hours they put in."

Eventually, the case went to arbitration under the rules of the American Arbitration Assn. How would you rule?

The Arbitrator Ruled:

He said he could not "distinguish between economically necessary overtime and overtime assigned as a matter of good industrial relations." So he said that the grievance had merit. But Helen wasn't entitled to 4 days' pay. The spot welders had worked a total of 16 hours. That was the extent of Helen's loss, and she was awarded 2 days' pay.

CAUTION: The award in this case is not necessarily an indication of how arbitrators might rule in apparently similar disputes. Each case is decided on the basis of the particular history, contract, testimony and other facts involved. Some of these essential details may have been omitted in condensing the original arbitration for brief presentation.

DoALL ECONOMY SPECIAL

VANADIUM HIGH-SPEED STEEL TAPERED END MILLS

Now you can buy end mills of this premium material to cut your machining costs—and still pay the same or less than for similar tools of conventional M-2 steel.

DoALL vanadium H.S.S. tapered end mills allow you to machine all conventional as well as hard, abrasive materials, Rc 30-40 and the newer, tough-to-cut, high-strength, high-heat-resistant metals. That's because these end mills have a higher red-heat hardness and substantially more resistance to abrasion. Their specially designed cutting face and taper give maximum cutting efficiency and make them ideal for use on extrusion dies, die-cast molds and similar work.

Try these DoALL vanadium H.S.S. tapered end mills for increased tool life at lower prices. Now available in a complete range of sizes and tapers—½, 1, 1½, 2, 3, 5, 7 and 10 deg. taper per side. Tips 3/32 in. through 3/8 in.

The Only End Mills with These 10 Important Features

- Vanadium High-Speed Steel
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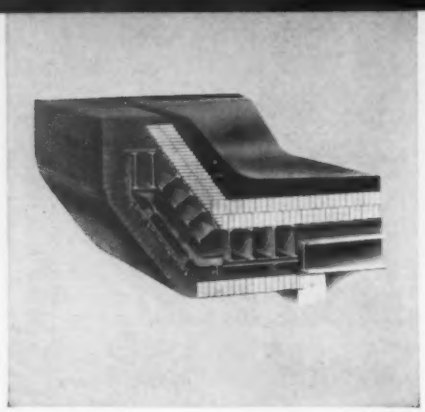
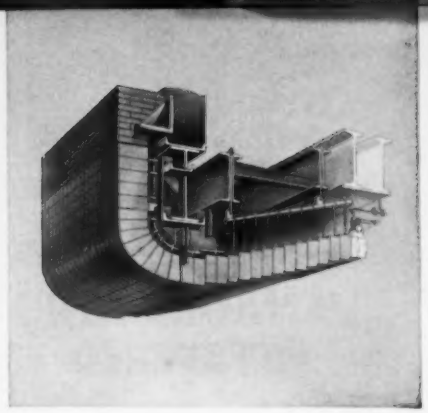




① HELD-UP, HELD-DOWN ROOF

- No roof centers to install.
- Easily hot-patched—Brick layers do entire job. No welding, no cutting.
- Pipe-supported—No special supporting members required.
- Inexpensive hangers—Simple, one-piece wire.
- Standard wedge brick—Wider bearing surfaces. More stability.

② INTERCHANGEABLE SUSPENDED CHILL WALL

- Low cost, simple installation—Adaptable supporting structure.
- Greater expansion flexibility—Tile engaged on bed joints.
- Safe load distribution—Self-supporting castings.
- Tightly sealed joints—Tongue-and-groove clay tile.

Brick recommended: Either MC-70 Cladex or interchange with Peerlac, 60% alumina.

③ INTERCHANGEABLE FAN TAIL

- Pipe-supported—Easily replaced with standard mill supply stock.
- Low-cost, simple installation—Adaptable supporting structure.
- Greatest strength—Fabricated steel nose supports.
- Higher heat resistance—Alloy hangers.
- Tightly sealed joints—Tongue-and-groove clay tile.

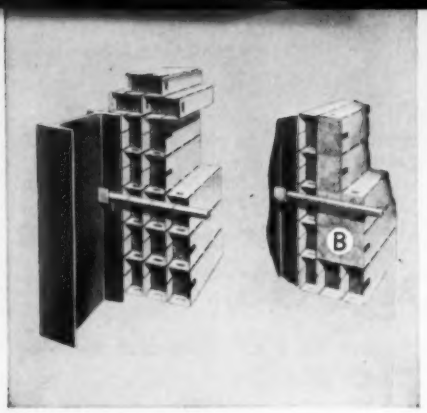
Brick recommended: Either MC-70 Cladex or interchange with Peerlac, 60% alumina.

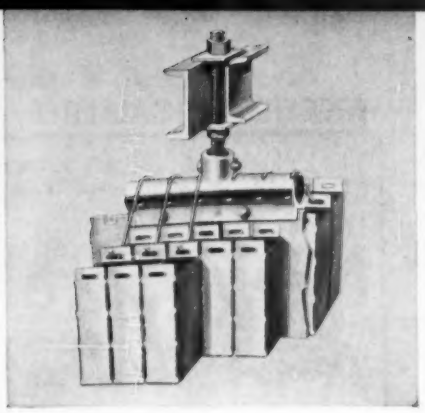
⑦ WATER COOLED OPEN HEARTH DOOR

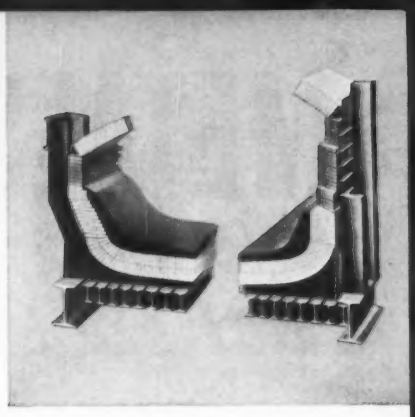
- Long life—Easily installed, easily replaced.

Recommended: Porter Plastikrom for door lining.

* Patents applied for
† T M. applied for







4 ENDWALL CONSTRUCTION

- Air-cooled tabs (4 sides of brick)—More heat conduction for more efficient cooling.
- Refractory reinforcement for hot spots—Extended casings* permit adding refractory material on cold face (B) as hot face wears.
- Cladding with Porter Cladex†—Dimpled construction of casings provide mechanical spacing for expansion.
- Basic strength—Porter construction eliminates need for tie plates.
- Ties and pipe easily reclaimed.
- Simple one-piece hangers—Wall can be dismantled without cutting or burning.

Brick recommended: MC-70 Cladex or other specified chrome and magnesite compositions.

5 AIR CLEANED, AIR COOLED*, TAB SUPPORTED ROOF BRICK

- Built-in air cleaning—Covers entire roof. No hand blowing.
- Controlled cooling over any area—for controlled wear.
- Tab support—Simple, inexpensive.
- Air-cooled tabs—More heat conduction for more efficient cooling.
- Positive support—Tie plate anchored to pipe.
- Inexpensive hangers—Simple, one-piece wire.
- Notched tie plates—Slip into place. Easily installed or replaced.

Roof brick recommended: CM-40R Cladex or other specified chrome and magnesite compositions.

6 HEARTH CONSTRUCTION

- Monolithic subhearth—Formed by Subhearth Kromform. Easy to install. Perfect conformation.

Brick recommended for inverted arch bottom: Porter M-90B, or other specified chrome and magnesite compositions.

Ramming mix recommended for working bottom: Porter Magnaram 95 for highest MgO content. Or Magnaram 85.

Brick recommended for back wall: MC-70 Cladex. Also other burned and unburned chrome and magnesite compositions.

Brick recommended for front wall: MC-70 Cladex in standard and special jamb brick. Also available burned or unburned chrome and magnesite compositions.

Announcing the Porter All-Basic Furnace—industry's most advanced all-basic open hearth roof

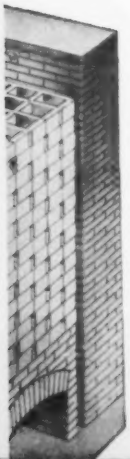
both suspension and refractories by Porter

It's here in detail . . . the Porter All-Basic Open Hearth!

A new concept in roof and endwall suspension employing the present fundamental construction now in use. Both incorporate a new, *all-metal cladding* method to provide proper expansion allowance throughout the entire system.

The suspension system and the basic refractory materials are designed to work together . . . no guesswork regarding either. There is no division of responsibility; Porter is your complete source.

For more information write *Refractories Division, H. K. Porter Company, Inc., Porter Building, Pittsburgh 19, Pa.*



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New Catalogues And Bulletins

Money-saving products and services are described in the literature briefed here. For your copy just circle the number on the free postcard, p. 143.

Heating Unit

Space-saving design, simple operation, and production-line economy features of a high-frequency induction-heater unit are described in a bulletin. The heater unit hardens, tempers, and anneals metal parts. The unit is also readily adaptable to many other heating and bonding applications. The bulletin also includes applications, specifications, components, safety and control equipment. (C. I. Hayes, Inc.)

For free copy circle No. 1 on postcard, p. 143

Stationary Compressor

Describing a stationary compressor, a 24-page bulletin includes specifications on three basic models. These basic models are semi-radially constructed units ranging from 1385 to 1948 cfm at 125 psi. Illustrated and explained are "package" design, components, intercooling, lubrication, motor mountings, and accessories. (Joy Mfg. Co.)

For free copy circle No. 2 on postcard, p. 143

Grate Coolers

An eight-page, illustrated bulletin reports on both horizontal-grate and inclined-grate coolers, as well as the clinker breaker. Full details with illustrations and schematic drawings of both coolers are set forth. The inside back cover is devoted to the clinker breaker. (Fuller Co.)

For free copy circle No. 3 on postcard, p. 143

Gear-Case Accessories

Gear-case accessories are listed in a 24-page catalog. The catalog features full scale, dimensioned drawings of every size of each of the company's products. This facilitates tracing by designers and draftsmen. The catalog also provides complete specifications on the accessories. (Technical Development Co.)

For free copy circle No. 4 on postcard, p. 143

Large Fasteners

Described in an informative four-page bulletin is a complete range of large fasteners in bolt diam 1¾ through 12 in. A wide variety of large fasteners, numerous types of bolts, plain- and upset-threaded rods, and construction accessories are illustrated in the bulletin. Also discussed are the facilities of the company for heat treating, galvanizing, and plating. (Jos. Dyson & Sons, Inc.)

For free copy circle No. 5 on postcard, p. 143

Round Chart Recorders

Features and applications, for a new line of round chart recorder-controllers, appear in a short bulletin. Single- and double-pen models are featured. These null-balance, potentiometric-type recorders feature a high degree of component interchangeability. (General Electric Co.)

For free copy circle No. 6 on postcard, p. 143

FREE LITERATURE

Continued

These publications describe money-saving equipment and services . . . they are free with no obligation . . . just circle the number and mail the postcard.

Numerical Controls

Are you wondering whether or not to use numerical control in your machining operations? A new guide book of numerically-controlled machine tools will help you make the decision. The informative 20-page booklet is divided into four sections: fundamentals of numerical control; how the different types of numerical controls operate; a section on a special numerically-controlled machine; and questions and answers. (Ex-Cell-O Corp.)

For free copy circle No. 22 on postcard

Lease Plan

A four-page brochure presents a simple description of a plan to lease machine tools. The important features are: there are no security deposits or down payments of any kind; finance charges are at low bank rates, and lease payments begin thirty days after shipment. (Jones & Lamson Machine Co.)

For free copy circle No. 23 on postcard

Slurry Pumps

Pumps, capable of metering slurries with up to 60 pct solids at a controlled-volume accuracy of ±2 pct, are discussed in a short bulletin. Flow volume can be varied from 0 to 180 gph at pressures to 90 psi by remote control electric timers, or by electrical probe mechanisms. (Milton Roy Co.)

For free copy circle No. 24 on postcard

Machine Guard

Fully described in a 2-page bulletin is a safety control which protects personnel and machines against injury. Applications and methods of operation of the electronic safety control, and full details of components are covered. (Security Controls, Inc.)

For free copy circle No. 25 on postcard

Displacement Pump

The subject of a short brochure is a displacement pump for feeding concentrated corrosive chemicals in the chemical and air-conditioning fields. The diaphragm-type pump is made of corrosion-resistant materials. It is capable of feeding chemicals such as sodium hydroxide, phosphoric acid, and caustic soda. The two-page, two-color bulletin contains a photograph of the pump, a list of chemicals it handles, and a list of features. (B-I-F Industries, Inc.)

For free copy circle No. 26 on postcard

Filler Metal and Flux

A new and economical solder, developed expressly for soldering titanium and titanium-base alloys at low temperatures, is the subject of a short technical paper. The new solder has a relatively low-flow temperature range. It becomes liquid and flows between 1300° and 1400°F. (Research Div., Curtiss-Wright Corp.)

For free copy circle No. 27 on postcard

Chemical Usage Chart

A four-page chart, on corrosion resistance, lists over 150 different chemicals and their recommended usage with ductile iron, iron, steel, stainless steel, monel, brass, bronze, copper, aluminum, and plastisol plastic. The chart also shows which gasket materials are needed for the various chemicals when couplers are used, and which O-ring materials are needed when swivel joints are used with these chemicals and compounds. (OPW-Jordan)

For free copy circle No. 28 on postcard

Wire Rope

New, up-to-date weights and strengths of wire rope are listed in a four-page bulletin. An explanation and description of wire-rope constructions and types are included

Postcard valid 8 weeks only. After that use own letterhead fully describing item wanted **3/10/60**

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FREE LITERATURE

in the bulletin, along with helpful information for ordering wire rope. (Macwhyte Wire Rope Co.)

For free copy circle No. 29 on postcard

Tiny Semiconductors

The word semiconductors no longer sounds strange as it did in 1954 when it was emerging from the laboratory stage. Today, this new field has come into its own in the electronics industry. Semiconductors include transistors, diodes, rectifiers, varistors, thermistors, micro-modules and many other variations. A descriptive bulletin provides valuable information. (Anchor Alloys, Inc.)

For free copy circle No. 30 on postcard

Veneer Knives

Current issue of a periodical bulletin provides a ready reference for veneer knives. Included is a description of technical literature available on shear blades and mounted wheels. (Simons Worden White Co.)

For free copy circle No. 31 on postcard

Fatigue Life

A 32-page design manual reports on a method for doubling fatigue life of high-tensile bolts. The manual illustrates a modified thread form which, installed in a series of elastic stop nuts, will at least double the fatigue endurance of a standard high-tensile bolt. The manual includes: 17 pages of findings related to the basic nature and causes of fastener fatigue, six detailed drawings of a new self-locking nut, and applicable fatigue-performance test results. (Elastic Stop Nut Corp. of America)

For free copy circle No. 32 on postcard

Control-Panel Design

Some important facts to be considered in designing an efficient control panel are discussed in a four-page paper. This fact file is recommended as a suitable guide to anyone considering the use of production control panels to solve materials-handling problems. (Fuller Co.)

For free copy circle No. 33 on postcard

Time-Saving Devices

Universal tap and die guides, angle plates, lock-vises, tappers, workholders and sine bars are featured in a catalog. Prices and illustrations also appear. (Lassy Tool Co.)

For free copy circle No. 34 on postcard

Hexagon Nuts

Providing all essential information any engineering or production department would require, a 12-page booklet gives basic engineering data and specifications on hexagon nuts. The hexagon nuts range in sizes ¼ to 3 in.; 12 pointer-nuts, sizes ¼ to ⅝ in., and three types of locknuts, sizes ¼ to 1½ in. (National Machine Products Co.)

For free copy circle No. 35 on postcard

Gold Plate Process

A six-page technical paper describes an industrial gold-plating process. Metallurgical properties, operational data and uses of the patented acid-type gold electroplating formulation are described. (Sel-Rex Corp.)

For free copy circle No. 36 on postcard

Plastic Traffic Lines

Use of permanent plastic traffic lines and markers in Wilkes-Barre, Pa., has proven highly successful. A short brochure points out that original plastic lines, placed on a street 5 years ago, are as good as the day they were installed. (Tech Industro Co.)

For free copy circle No. 37 on postcard

Live Centers

Large thrust bearings take all thrust loads in a new line of engineered live centers. Other large radial bearings take radial loads. Specifications and prices for the live centers appear in a four-page catalog. (Sturdimatic Tool Co.)

For free copy circle No. 38 on postcard

Aircraft Tubing

Designed in the shape of a file folder, a chart gives aircraft-tubing specifications, its applications, and physical and chemical properties. (Tube Distributors Co., Inc.)

For free copy circle No. 39 on postcard, p. 143

Induction Heating

An eight-page booklet graphically illustrates different types of induction-heating equipment and applications. Data include: selection chart for billet heaters; melting rates in pounds per hour; table of frequencies; and individual product specifications. (Ajax Magnethermic Corp.)

For free copy circle No. 40 on postcard, p. 143

Tap Selector

Correct taps for all purposes, regardless of the type of material, can now be ordered by catalog number with the tap-selector catalog. This method of specifying taps should prove of great help to all production and purchasing personnel. The various charts indicate what stock taps are available for all classes of thread fit. The 25-page selection booklet also includes a section on price and gage information. (The Hanson-Whitney Co.)

For free copy circle No. 41 on postcard, p. 143

Cable Connector

Depicting the offset design of a cable connector, an illustrated brochure points out some advantages offered by the connector. The welding cable connector has a patented locking action. The connector will not overheat or arc; joins with a twist of the wrist; has no moving parts. The brochure also lists replacement parts. (Ampco Metal, Inc.)

For free copy circle No. 42 on postcard, p. 143

Electrical Steels

Supplying information on oriented electrical steels, a 64-page manual informs readers on what these special grades are, their advantages, and their effect on transformer design. Other sections include information on how the steels are supplied, surface insulation, physical and mechanical properties, and magnetic properties. Also covered are core design, stress-relieving anneal, methods of testing, and use of curves. (For free copy write on company letterhead to Armco Steel Corp., 4159 Curtis Street, Middletown, O.)

For free copy circle No. 43 on postcard, p. 143

Breadboard Parts

A pocket-size technical booklet provides an illustrated outline of how instrumentation development problems can be solved with mechanical breadboard components. Numerous design hints and recommendations for instrument engineers and designers appear in the informative booklet. (PIC Design Corp.)

For free copy circle No. 44 on postcard, p. 143

QUANTITY PRODUCTION OF GREY IRON CASTINGS

ONE OF THE NATION'S LARGEST AND MOST MODERN PRODUCTION FOUNDRIES

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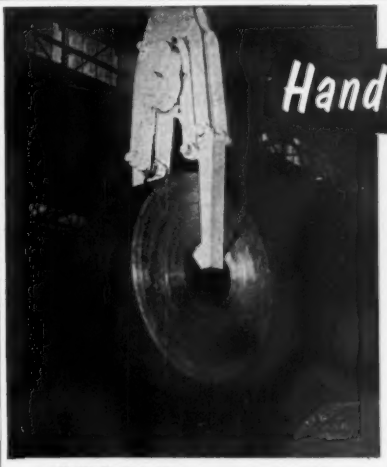


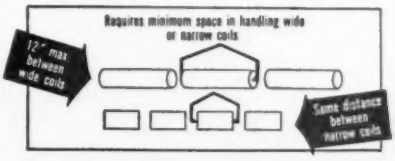
Handling Coil Stock?

CHECK THESE

C-F LIFTER ADVANTAGES

- 1 Lifter handles wide range of coil sizes
- Requires minimum of only 10" to 12" between piles —saves storage room
- 1 man operation — eliminates hookers
- Positive grip on coil — no damage to material

• C-F Coil Lifters are saving time and labor in many plants and warehouses because they can pick up, carry and set down a coil of steel faster and safer than any other method. Infinite jaw openings permit handling a very wide range of coil widths . . . carrying legs open fast, stay open until operator closes them on coil. Narrow legs require minimum space between piles – a space saving advantage. Made in motorized models for crane cab or pendant operation as well as manual types with chain wheel, in capacities from 3 tons up. Powered Rotating Heads available. Opening ranges to suit your requirements. Write for illustrated Bulletin.



CULLEN-FRIESTEDT CO.

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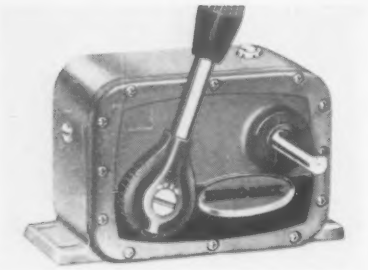
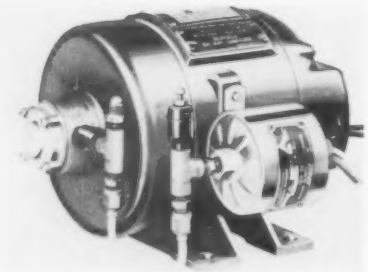
New Materials and Components



Speed Drive Gives Overload Protection

Featuring built-in overload protection and a control for fast and precise speed setting, a variable-speed drive provides unlimited speed control with a finger's touch. It has an output range from 0 to 1200 rpm with 1800 rpm input. Other features include wider mounting pads, and double-slotted holes for greater stability and easier alignment. Speed settings can be changed instantly, at any time. The device provides smooth, stable drive with constant torques from 3 to 450 in-lb. (Zero-Max Co.)

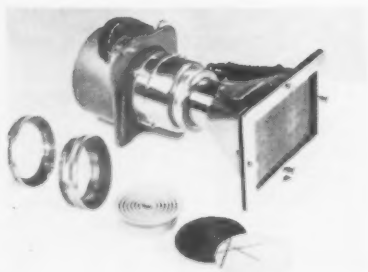
For more data circle No. 45 on postcard, p. 143



Air Pump Has No Oil Contamination

An oil-free air pump provides 20 psi automatic pressure. For industrial processes or machines requiring this pressure, the air pump features a pressure switch. The switch permits automatic shut-off under increasing pressure conditions at 20 psi, and automatic re-start under decreasing pressure conditions at 18 psi. Rated pump capacity is 0.30 cfm of free air delivery at 20 psi discharge pressure. Pump displacement is 0.304 cu in. per revolution. The pump provides 3450 rpm. (Lear, Inc.)

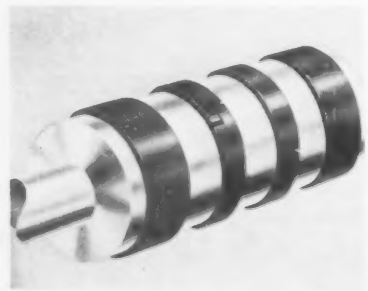
For more data circle No. 46 on postcard, p. 143



Air Sampler Collects Large Volumes of Air

Used to measure air-borne particle matter of all kinds, a portable air sampler measures matter as small as 1/100 of a micron in diam. Utilizing a turbine-type blower, it can draw in large samples of air in a short space of time. Filter-holder adapters make it possible for the machine to do this. Used either indoors or outdoors, the sampler proves useful in the detection and measurement of smoke, air hazards in mines, occupational dusts, and radioactive particles. (The Staplex Co.)

For more data circle No. 47 on postcard, p. 143



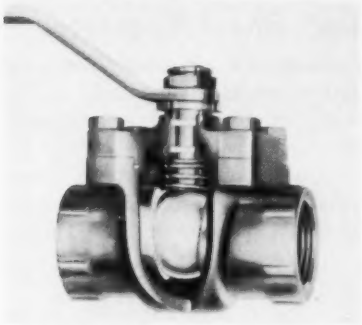
Filled Teflon Piston Rings Need No Lubrication

Filled teflon piston rings seal reciprocating, oscillating, and rotary motion of external and internal cylindrical surfaces, against the leakage of liquids or gases. The rings are suitable for continuous service in a temperature range from –420 to 500°F. They have the ability to imbed hard foreign particles without adversely affecting the cylinder life or the ring itself. The rings are widely used in such operations as: processes involving gases, solvents, and non-lubricants. (The Garlock Packing Co.)

For more data circle No. 48 on postcard, p. 143

Ball Valve

A ball valve provides the full flow of a gate valve, the tight shut-off of a globe or needle valve, and the quick quarter turn of the plug-valve. Reducing initial in-place cost and valve-maintenance cost, the valve also features two-way flow, minimum pressure drop, self-adjusting seats, top entry removal, no lubrication, and non-cycling spring. The valve can take temperatures up to 350°F, and pressures up to 700 psi. It can handle almost all fluids, semi-solids, compressed gases, and compressed air. (Hills - McCanna Co.)



For more data circle No. 49 on postcard, p. 143

Dry-Bonded Lubricant

Packaged in a pressurized container, a compound in a sprayable suspension provides a dry, hard, permanently-lubricated surface. It will stay bonded even under conditions of extreme pressure and temperature. The lubricant operates at temperatures as low as —300°F, and as high as 500°F. It provides wear protection at pressures as high as 50,000 psi. The lubricant can be applied to steel, copper, brass, nickel, and many others. (EverLube Corp. of America)

For more data circle No. 50 on postcard, p. 143

Photoelectric Switches

Photoelectric cover-plate switches automatically turn lights on at dusk and off at dawn. Absence or presence of light on the photoelectric eye operates the switch. Requiring no time setting, the switch has up to a 3-minute time delay. This prevents lights from being turned off by a momentary flash of light. Fit-

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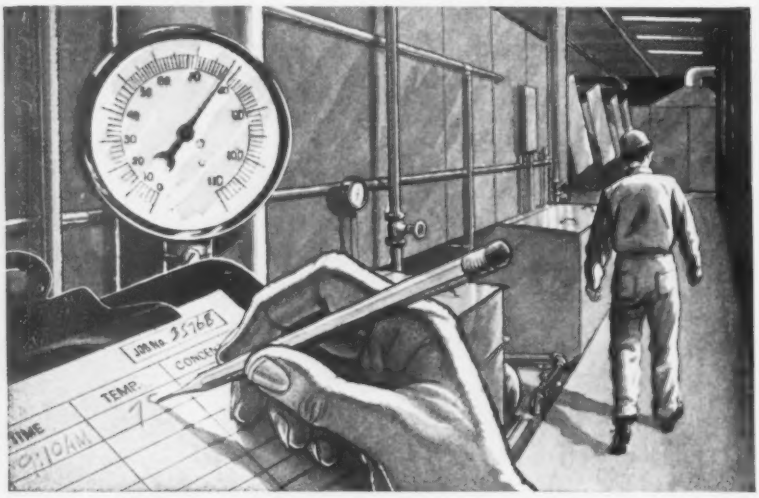

Oakite ROOM-TEMP cleaner cuts solution heating costs

That's right! Oakite Room-Temp cleaner gives good cleaning results at 70° to 100°F.—the temperature range you find in most industrial cleaning areas. This cleaning efficiency can save you money on steam normally required for heating of cleaning solutions.

Designed primarily for spray-wash machines, Room-Temp cleaner is non-foaming . . . good for steel, iron, brass, aluminum . . . has no odor . . . requires no ventilation.

Room-Temp cleaner provides top rust protection for in-process parts, too. It dries to a thin film that stops corrosion from attacking iron and steel for more than 300 hours at 90% humidity, 100°F.

ASK THE OAKITE MAN to tell you more . . . or to help you choose from the complete Oakite line a spray-washing material that offers most economy for the parts you're processing. Or, write for application data sheet B-6972. Oakite Products, Inc., 34E Rector Street, New York 6, N. Y.

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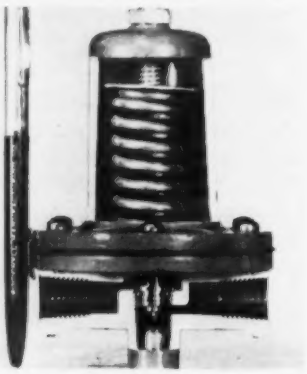
years' leadership in industrial cleaning

ting standard outlet boxes, the switch's electrical rating is: 10 amps, 115 v ac, 400 w incandescent, and 1000 w fluorescent or mercury vapor. Two models of cover plates —round or rectangular—are available. (Energy Kontrols, Inc.)

For more data circle No. 51 on postcard, p. 143

Instrument Regulator

Suited for air supply lines for production-line equipment, an instrument regulator is applicable wherever a controlled supply of air or gas pressure is needed. Constructed of pressure die-cast aluminum, the instrument has a maxi-

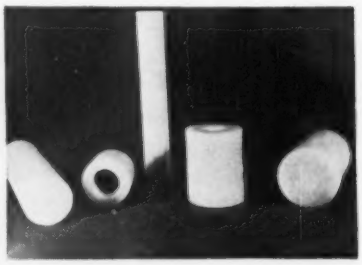


mum inlet pressure of 250 psi and outlet pressure ranges of 0-5, 5-35, and 35-100 psi. Optional construction includes a handwheel adjustment and a ¼-in. side outlet trap for pressure-gage mounting. (Rockwell Mfg. Co.)

For more data circle No. 52 on postcard, p. 143

Rod and Cylinders

In rod and cylindrical form, polypropylene allows users to make prototypes for in-plant or in-field testing. Ideal for elevated-tempera-



ture and rigid-construction service, the material can be easily machined, ground, drilled, threaded

and welded, with standard woodworking or machine tools and equipment. It also provides good impact resistance. (American Agile Corp.)

For more data circle No. 53 on postcard, p. 143

Screw Sockets

Allen-type screw sockets drive ½-, 9/16-, and ⅝-in. Allen-type set screws. The sockets can be used on road-building equipment, mining machinery, and other industrial uses

for other Allen-type set screws. Scientifically-tempered bits are long wearing, and replaceable. They are set in heavy chrome-plated sockets. (Proto Tool Co.)

For more data circle No. 54 on postcard, p. 143

Relay Amplifier

A photoelectric amplifier relay, reflector type, provides a compact, self-contained pickup for use with various company controls and counters. The position of the light source and photo unit is adjustable as to the angle and reflection of spot distance. A company series of relays contain the controls for adjusting the light sensitivity and the photo sensitivity in the reflector - type pickup. With these controls, the relay can be triggered to act at any desired threshold of reflected light. The unit measures 1¾ x 2½ x

Photos courtesy of D. S. Kennedy & Co., showing L-8 Lift Table installation.

Double Duty

de-burring done *during* re-skidding

Southworth Lift Tables* solved D. S. Kennedy & Co.'s problem of how to jockey flange blanks up and onto a multiple spindle drill press, bore eight holes, then re-skid with a minimum of physical effort and a maximum of speed. What's unusual, however, is that *one doubles as a work table.* The take-off man de-burrs each flange while re-skidding, adjusting the working height when each layer is completed . . . an extra materials handling convenience and an operational economy all in one. For further information on Southworth Lift Tables as aids in cost reduction write to:

*PATENT PENDING

SOUTHWORTH MACHINE CO. since 1890

SOUTHWORTH LIFT TABLES

a division of SOUTHWORTH MACHINE CO., 348 Warren Ave., Portland, Me.

2¾ in., and may be used for inspecting, sorting, counting, and control for the difference in reflected light. (Photomation, Inc.)

For more data circle No. 55 on postcard, p. 143

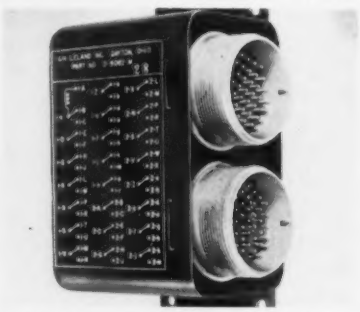
Silencer

Designed for high-velocity air or gas flow, a silencer has a perforated air-passage tube. Sound absorption material, in the outer shell, encloses the tube completely. Resistivity to flow with this straight-through tube design is somewhat equivalent to an equal length of straight pipe. Designed for easy installation on heavy-duty applications, the unit is leak-resistant with continuous-welded shell seams, double-seal crimped ends, and female pipe connections on both ends. The units give service where air or gas is comparatively free from moisture and temperatures up to 210°F. (Universal Silencer Corp.)

For more data circle No. 56 on postcard, p. 143

Stepping Switch

Weighing only 2 lb 1 oz, a 22-pole, two-position hermetically-sealed stepping switch is enclosed in a container with an atmosphere of dry nitrogen. The nitrogen protects it from dust, moisture, and fungus. This non-shorting alternate stepper meets MIL-E-5272A specifications for shock, vibration, extreme temperatures, salt spray and acceleration. Current at rated coil voltage

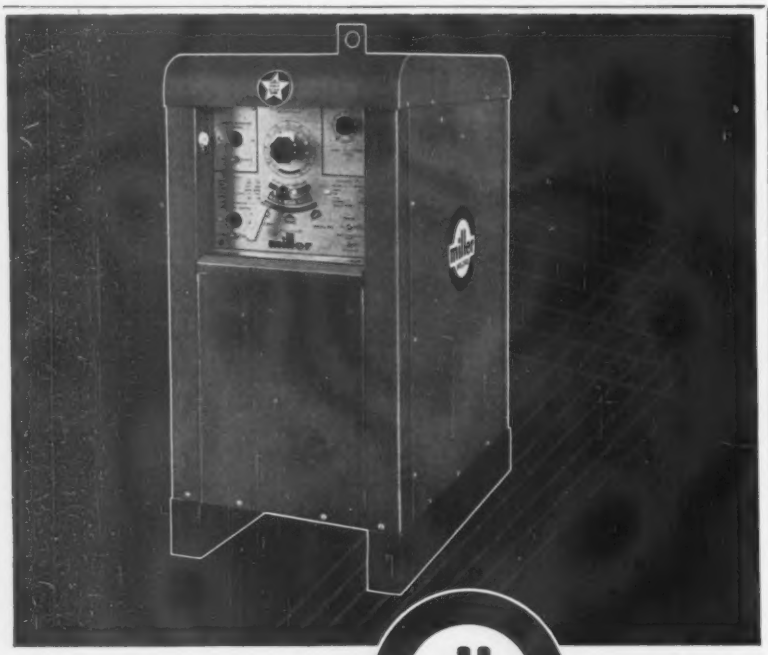


is 3.50 amps; normal rated voltage, 28 v dc; approximate switching rate, under 30 milliseconds; contact rating, ½ amps resistive at 110 v ac, 2½ amps resistive at 28 v dc; dielectric, 1200 v rms coil to case; life ½ million steps minimum. The switch can meet vibrations of 200 cycles per second at 10 G's; operating temperature range, —55° to 80°C. (G. H. Leland Inc.)

For more data circle No. 57 on postcard, p. 143

Selector Valve

Intended for use with gas analyzer circuits, a dual four-port selector valve permits reversal of flow direction of two fluid systems through two alternate systems. Use of O-rings, precision-fitted into specially machined grooves, eliminates body and cross-port leakage. The valve is easy to operate, and requires no adjustments. Long service



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. . . . becomes evident after sufficient exposure to the original cost/maintenance costs/production/profits equation.

Exploiting the full potential of better basic design, the Miller Gold Star 300 series ac-dc welders convert in minutes from the prime ac-dc welder of exceptional performance to any of these three A-C applications: Metallic Arc, manual or automatic Inert Gas; or, to any of the following D-C applications: Metallic Arc, manual or automatic Inert Gas, or Inert Gas spot welding.

It's important to note that the Miller conversion kits utilized to obtain any of the above simply extend the built-in superiority of the 300 series' welding characteristics into the type of application desired. It's adaptable by design — not discovery.

Available in 200, 300, 400 and 600 ampere models, all feature the exclusive Miller transformers and semi-metallic rectifiers. Complete specifications, including duty cycle chart, will be sent promptly upon request.

miller ELECTRIC MANUFACTURING COMPANY, INC., APPLETON, WISCONSIN

• Distributed in Canada by Canadian Liquid Air Co., Ltd., Montreal

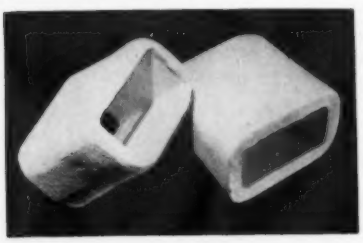
life, simple maintenance, limited-flow passages, and minimum dead volume are other features which recommend this valve for use with helium or other gas test systems. Plugging one port in either of the

dual valves converts it to a three-way operation. The valve will operate at temperatures from —40° to 350°F, depending on O-rings specified. (Circle Seal Products Co., Inc.)

For more data circle No. 58 on postcard, p. 143

Integral Shapes

Exhibiting very low thermal conductivity at temperatures to 2200°F, a low-density material—fibrous potassium titanate—forms into complex integral shapes. The shapes formed are: rectangular and curved pads and solids—both flat



and arched; uniform circular pipe shapes; disks, bowls, and many others. The wide-application insulating material has an average bulk density of 16 lb per cu ft for premium applications. (Resisto Chemical, Inc.)

For more data circle No. 59 on postcard, p. 143

Anchor Bolt and Well

Safely and easily anchoring large presses and heavy machinery, a retractable anchor bolt and well saves time and expense. There is no projection above the floor surface to

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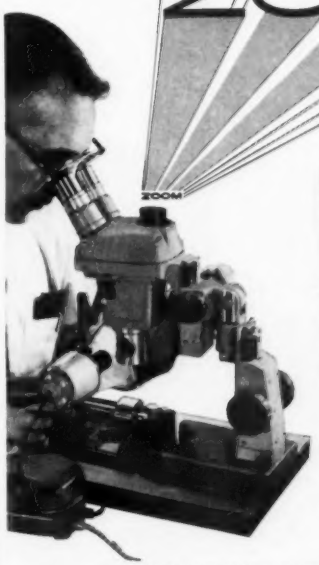

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EXCLUSIVE NEW OPTICS!

Get StereoZoom...continuously variable power! Just a turn of the knob gives an infinite choice of magnifications throughout the whole stereo range . . . to 120× on some models.

EXCLUSIVE NEW POWER POD DESIGN!

A wholly enclosed optical system in a single unit. Keeps out dust and dirt; eliminates old fashioned nosepieces, annoying image jump and blackout. NEW VERSATILITY, TOO! Your choice of StereoZoom or fixed power in a Power Pod that interchanges among any of five basic stands.

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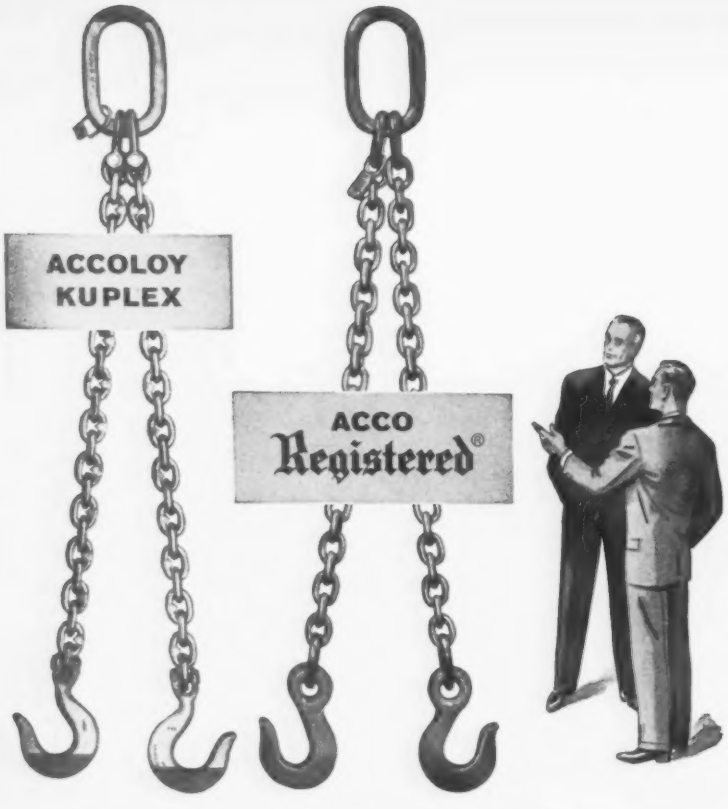

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One-day delivery is forthcoming when you specify ACCOLOY KUPLEX Sling Chains. Made up locally by an authorized KUPLEX distributor, these slings feature matched components which have been proof-tested at the factory at twice working load limits to assure their being as strong as the chain itself.

Factory-built all-welded construction is assured when you buy ACCO *Registered* Sling Chains. Registration ring and certificate—signed by ACCO—attest to the successful test performance of the sling.

See your local distributor for ACCO *Registered* or ACCOLOY KUPLEX sling chains. If by chance he does not carry the sling you want, write our York, Pa., office for further details.

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• Factory-built with ACCOLOY 125 chain. Chain is welded under scientific control and heat treated to optimum strength levels. New Shaped Master Link withstands deformation under heavier loads.

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*Indicates Warehouse Stocks

cause interference when moving equipment into place. The bolt is dropped to the bottom of the well; after positioning the equipment, the

anchor bolt is pulled up through the bolt hole. The rectangular shape of the well and bottom plate prevents the anchor bolt from turning. (Paton-Reynolds Co.)

For more data circle No. 60 on postcard, p. 143

Wiper-Scraper

A rod-wiper seal incorporates both a rod wiper and a rod scraper within a single unit. It provides effective, low-cost protection for packings on reciprocating shafts and hydraulic cylinders exposed to heavy dirt conditions. The scraper removes frozen or caked mud, tar

and other materials firmly stuck to the rod. This prolongs packing life, protects bore finishes, and reduces equipment down time. The seal consists of a thin brass scraper ring in tandem with a pliable synthetic-rubber wiping member. (Chicago Rawhide Mfg. Co.)

For more data circle No. 61 on postcard, p. 143

Magnet Brakes

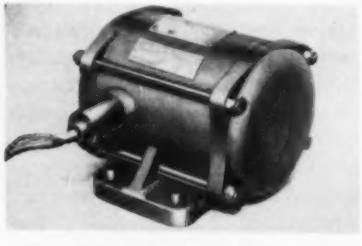
Increased reliability and simplified maintenance are featured in a redesigned line of direct-current

magnet brakes. Key features of this brake family are an improved epoxy-potted magnet-coil assembly, single-end adjustment and exclusive slip-in brake-lining replacement. All adjustments are made from one end of the brake. Sizes range from 8 to 23-in. wheels. The brakes are widely used in braking and holding steel-mill drives, cranes, hoists, conveyors, and other industrial use where continuous service is of importance. (General Electric Co.)

For more data circle No. 62 on postcard, p. 143

Electric Vibrator

Giving practically noiseless operation, an explosion-proof electric vibrator moves stubborn materials through bins, chutes, and hoppers. The vibrator delivers 3600 vibrations per minute with 60-cycle current. The user can adjust vibration impact from 385 to 1100 lb with



seven separate settings. The unit is available in 3-phase, ac current either 220 or 440 v, with an input of 500 w. Weighing 51 lb, the unit measures 9-in. long, 8½-in. wide, and 6-in. high. (The Cleveland Vibrator Co.)

For more data circle No. 63 on postcard, p. 143

Pressure Gages

Heavy-duty, geared - movement pressure gages meet a wide range of industrial applications. They are recommended for oil, water, air, steam, certain gases, and any other media not corrosive to brass or bronze. Integral design of the socket, tube, tip, movement, pointer and dial assembly permits installation by hand-turning the gage case. This design also eliminates inaccuracies in pressure readings resulting from distortion of piping. (American Chain & Cable Co., Inc.)

For more data circle No. 64 on postcard, p. 143

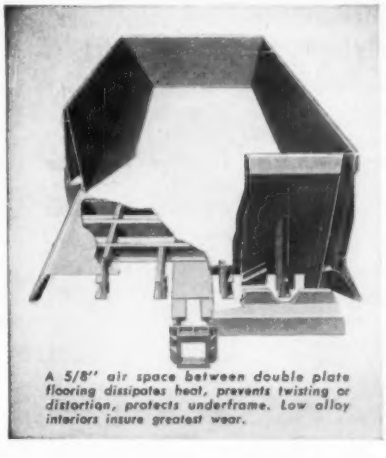
NEW BOOKS

"Industrial Ventilation," sixth edition (1960), contains informative data, practical hood designs, and procedures for design and ductwork and selection of fans and collectors. Principles and applications are illustrated by 138 drawings. These include 64 specific hood designs. The manual was written by practicing ventilation engineers for use by designers, sheet metal fabricators and ventilation engineers. Hardcover $7.00, Flexible Cover $4.00. Committee on Industrial Ventilation, P. O. Box 453, Lansing, 2, Mich.

"Letter Symbols for Rocket Propulsion; ASA Y10.14-1959," gathers in one volume symbols for terms and concepts frequently used in the design, manufacture and operation

MAGOR AIR DUMP CARS

FOR STEEL PLANT SERVICE

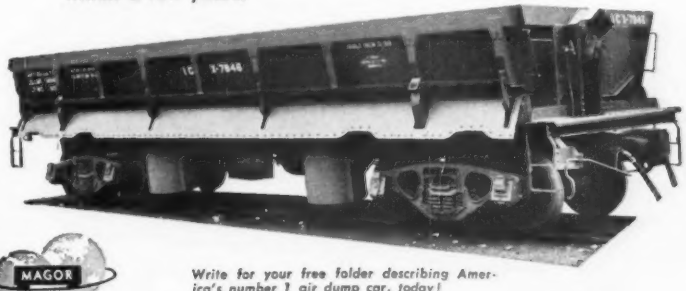


A 5/8" air space between double plate flooring dissipates heat, prevents twisting or distortion, protects underframe. Low alloy interiors insure greatest wear.

The new Magor Air Dump Car for steel plant service can cut your refuse disposal costs as much as 40%! Safe, swift, automatic dumping eliminates expensive labor and crane equipment. Low height and open type body means faster loading. Saves time, labor and haulage costs! Smooth interiors eliminate "dead load" returns!

The double-plate flooring shown here is just one of the many Magor design features that account for Magor's leadership in dump car production. Designed for the job — built to last, Magor Air Dump Cars cost less to buy — less to operate!

Savings effected by the new Magor Air Dump Cars will write off your entire dump car investment within a few years.



MAGOR

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NEW BOOKS

of rockets. Where more than one symbol is in common usage, the standard designates one as the preferred symbol, but includes others as alternates. The time-saving symbols permit specialists to abbreviate expressions clearly; thus saving valuable engineering hours. $1.50. The American Standards Association, 70 East 45th St., New York.

"Principles of Engineering Economy," by E. I. Grant and W. G. Ireson, analyzes the economic aspects of engineering decision-making. Now in its fourth edition, the book gives basic principles for making hundreds of practical decisions, such as acquisition and retirement of capital goods, income tax considerations of investment proposals and choice between alternate methods of financing. Two points are stressed: It's only prospective differences between alternatives that are relevant; and any proposed investment should provide a financial return commensurate with the returns obtainable from other investment opportunities. 574 pp. $8.00. The Ronald Press Co., 15 East 26th St., New York 10.

"Fracture," edited by B. L. Averbach, D. K. Felbeck, G. T. Hahn and D. A. Thomas, reports what actually occurs on an atomic scale when materials fracture. The 41 contributors to the book—representing the world's outstanding research workers in the field—discuss current theories and experiments for the cleavage, ductile, fatigue, and high-temperature mechanisms of failure for metals, ceramics and polymers. One of the most valuable features of the book is the outline of future research needs. 646 pp. $17.50. John Wiley & Sons, Inc., 440-4th Ave., New York 16.

"ASTM Standards on Metallic Coated Iron and Steel Products; A-5" contains 25 specifications, six methods of test and three rec-

ommended practices. This second edition is almost a complete revision of the first edition issued in 1956. Of the 34 standards, all but five have been newly added, revised, or have had their status changed. Engineers and scientists concerned with coated metallic products, corrosion and maintenance will find this compilation useful. 176 pp. $3.50. ASTM Headquarters, 1916 Race St., Philadelphia 3.

"Radioisotopes For Industry," by R. S. Rochlin and W. W. Schultz, explains how industry can apply radioisotopes to a vast number of applications. Sufficient material is included with each description so that the reader can project the examples into his own needs. 190 pp. $4.75. Reinhold Publishing Corp., 430 Park Ave., New York 22.

"Structure and Properties of Thin Films," edited by C. A. Neugebauer, J. B. Newkirk and D. A. Vermilyea, presents the complete proceedings of an international conference on thin films held at Lake George, N. Y., in September 1959. Review papers, contributed by recognized experts in their specialized fields, discuss problems which have been recently solved and those that still await solution. Topics include the preparation, growth and structure of thin films, and the mechanical, electrical, optical and magnetic properties of the films. In addition —since a large fraction of thin atoms resides on or near the surface—a review of processes occurring at the metal surface is given. 561 pp. $15.00. John Wiley & Sons, Inc., 440-4th Ave., New York 16.

"Automotive & Machine Shop; Power Press & Forging," volume 3, contains 40 pages on industrial safety for machine shops and foundries. The most interesting section of the manual deals with future trends in safety standards. $0.65. The National Safety Council, 425 N. Michigan Ave., Chicago 11.

OSBORN®

BEFORE BRUSHING
Insulation residue on this small, copper electric motor commutator was a knotty, costly cleaning problem. Rate: 800 per hour.

AFTER BRUSHING
Surface quality-finished . . . insulating material and feather burrs gone . . . ready for trouble-free assembly. Rate: 3500 per hour.

Production soars from 800 to 3500 pieces per hour

...with OSBORN power brushing

PRODUCING at the rate of 3500 pieces per hour (over 330% greater than former off-hand method) these Osborn TY® Master® Wheels remove troublesome phenolic-type residue from electric motor commutators at Dayton Precision Manufacturing Co.

Slow, off-hand methods were being used to remove insulation residue from these commutators. Production was costly . . . parts lacked uniformity.

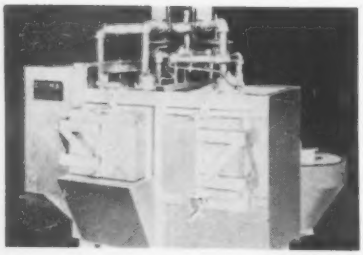
A specialized, but simple machine now handles the operation. Parts are automatically fed along a guide tube and through a pair of Osborn TY® Master® Wheel brushes. In this centerless type finishing setup—the job is done effectively in pre-set time cycles. Results: production and quality up—rejects eliminated . . . time and costs down.

Cleaning and finishing problems in your plant can be solved with similar production savings. An **O**sborn **B**rushing **A**nalysis—made in your plant now at no cost or obligation—is the first step. Write us for full details. *The Osborn Manufacturing Company, Dept. F-93, Cleveland 14, Ohio.*

Osborn Brushes

METAL FINISHING MACHINES . . . AND FINISHING METHODS
POWER, PAINT AND MAINTENANCE BRUSHES • FOUNDRY PRODUCTION MACHINERY

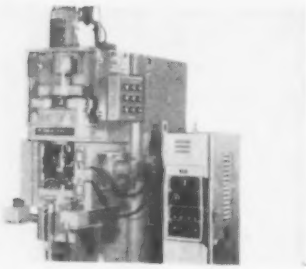
New Equipment and Machinery



Melting Furnace Insures Metal Purity

Design principles, of an aluminum melting furnace, virtually eliminate hydrogen pick-up and oxide inclusions. This keeps metal at a very high purity level. For use with aluminum die-casting machines, the furnace further insures metal purity with zone dividing walls extending below surface of the bath. Radiant-panel firing provides fast, uniform heat distribution, eliminates flame impingement, and reduces overall fuel costs. (J. A. Kozma Co.)

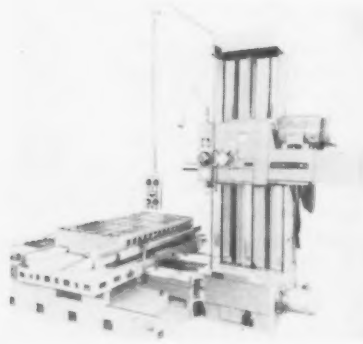
For more data circle No. 65 on postcard, p. 143



Welding Machine Provides Versatility

Making full - area percussion welds, a magnetic - force welding machine adapts to many operations that require joining nonferrous metals. The unit is a 100-kva magnetic-force projection and spot welding machine, with dc holding-coil delayed forge. The machine also has a diaphragm safety head, and selective micro-switch firing features. Electronic welding control is fully synchronous with selective half cycle and positive and negative heat control functions. (Acro Welder Mfg. Co.)

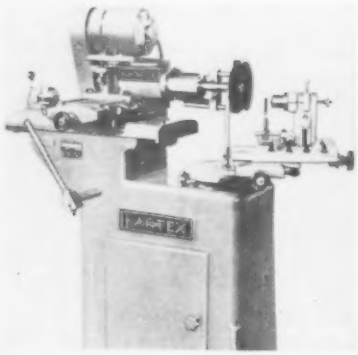
For more data circle No. 66 on postcard, p. 143



Multi-Function Machine Has Remote Control

Designed to receive all automatic control systems, a horizontal boring, drilling, and milling machine has a pendant control. This control provides remote operation of headstock, spindle, table, and saddle functions, including start, stop, direction, traverse, speed, feed, and electrohydraulic clamping. Use of a motorized headstock, with 30 or more hp, gives a close-coupled drive and application of full design power to the spindle. Other features are: three-way column, automatic lubrication, joy - stick directional control of milling feeds, and independent milling-feed motor. Designed and powered as a 6-in. spindle machine, it is also available as a 5-in. spindle machine. (Giddings & Lewis Machine Tool Co.)

For more data circle No. 67 on postcard, p. 143

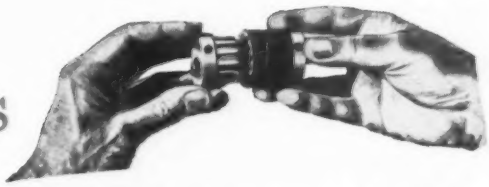


Profile Grinder Provides Accurate Finishes

A tangent-arc profile grinder sharpens cutting tools having radii in the cutting surface and grinds clearances on profile-type, straight or angular cutters. The grinder has a reciprocating horizontal wheelhead and a revolving workhead. It can accommodate arbor-type cutters up to 10° in diameter and taper shank mills up to 12 in. overall length. The setup includes life-sealed ball-bearing spindle and ⅓-hp dynamically-balanced motor. The capacities of the unit (held between centers) are 4¾ in. diam and 10 in. long. Capacities of concave and convex radii are 5½ in. Two cross slides on the wheelhead and three slides on the workhead provide adjustment. (Hartex Div., Union Twist Drill Co.)

For more data circle No. 68 on postcard, p. 143

US RUBBER **PowerGrip** FLEXIBLE COUPLINGS

These couplings  are so simple in design that their cost is LOW compared with other couplings. Insist on having U. S. PowerGrip Flexible Couplings tried on your machinery and then watch your costs go down. Installation is quick and easy. No maintenance, no lubrication. Call now!

The only way to get expert transmission engineering is through your U.S. Rubber Transmission Distributor.

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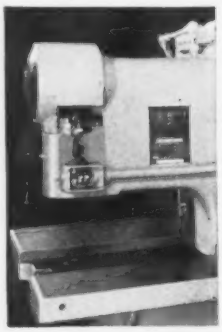
NEW... IMPROVED... model 15A

the STRIPPIT
FABRICATOR

for high-profit, low-cost punching, notching and nibbling...for prototype, short and medium production runs



FEATURING the new *Strippit Electro-Hydramatic Head* — simplified design... minimum number of parts... needs no pressurized air. Makes the 15A easier to install, simpler to maintain, more economical to operate.

punches
any round or shaped hole up to 3½" diameter in sheet material — up to ¼" mild steel.

notches
90° corners — rectangular, radii, vee and special shape edge notches — up to ⅛" capacity in mild steel.

nibbles
straight line or contour shearing up to 38" diameter circle, at 165 strokes per minute, ⅛" mild steel.

accurate, quick-set gauging
a unique, multiple-stop system for exact work positioning to any layout specifications — *in seconds.*

quick-change punches and dies
from one size to another in less than 20 seconds — within easy reach in labeled, built-in file drawers.

easy conversion
to a high speed production punching unit with the Strippit Duplicator and the Dupl-O-Scope or Microbars to punch Duplicator templates.

WRITE TODAY
for new Catalog 15A and demonstration at your own plant of the capabilities of this high-profit fabrication system.

UNIT OF HOUDAILLE INDUSTRIES INC.

WALES **STRIPPIT** INC.

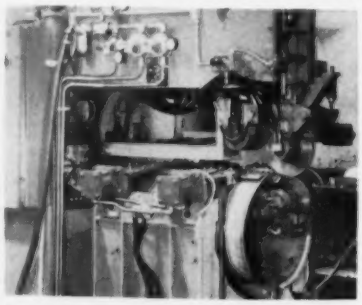
202 Buell Road • Akron, New York

In Canada: Strippit Tool & Machine Company, Brampton, Ontario

NEW EQUIPMENT

Drum Welder

A low-cost, semi-automatic utility unit, mash seam welds containers in a range of sizes from 14 to 22½ in. in diam, and up to 40 in. long. A single operator can turn out up to 250, 55-gal drums an hour with the machine. Feature of the unit is a flexible band clamp,

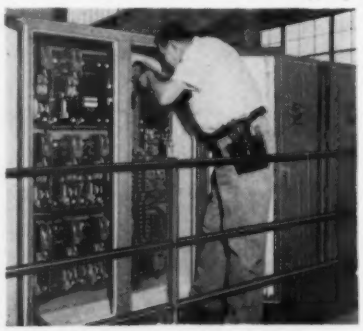


housed in a traveling fixture, which completely encloses and contains the periphery of the work. The clamp achieves a narrow lap, and eliminates end splitting. The machine automatically ejects the welded cylinder. (National Electric Welding Machines Co.)

For more data circle No. 69 on postcard, p. 143

Front Controllers

Front-connected controllers eliminate the need for back-aisle space on crane walkways. All wiring and control components are accessible from the front, with ample working space inside the cabinet. Saving up



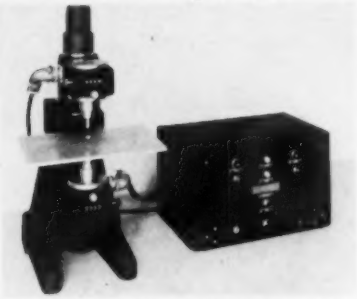
to 20 in. of cat-walk width, they are up to 10 to 15 pct lighter than equivalent controllers with conventional wiring. Control components are mounted on insulated bases, which in turn are mounted on panel studs projecting from the rear of

the cabinet. Furnished with 2, 3, or 4 decks to suit headroom requirements, the controllers are available for single-motor dc drives up to 225 hp. (EC&M Div., Square D Co.)

For more data circle No. 70 on postcard, p. 143

Electronic Micrometer

An opposed-head measuring device permits pressureless measurement from two sides to the centerline of a fragile or compressible part. Opposing micrometer tips may be zeroed against each other at a selected reference position, or at

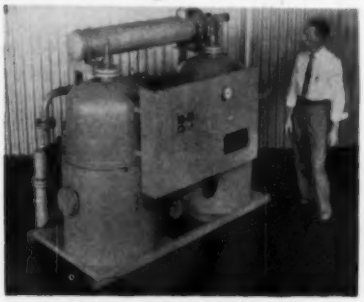


the anvil surface. Setups can be made using dummy parts and carriages which are placed between the two micrometer tips at the desired point of measurement. Measurements to 20 millionths of an inch are automatically displayed on easily read counters. (J. W. Dice Co.)

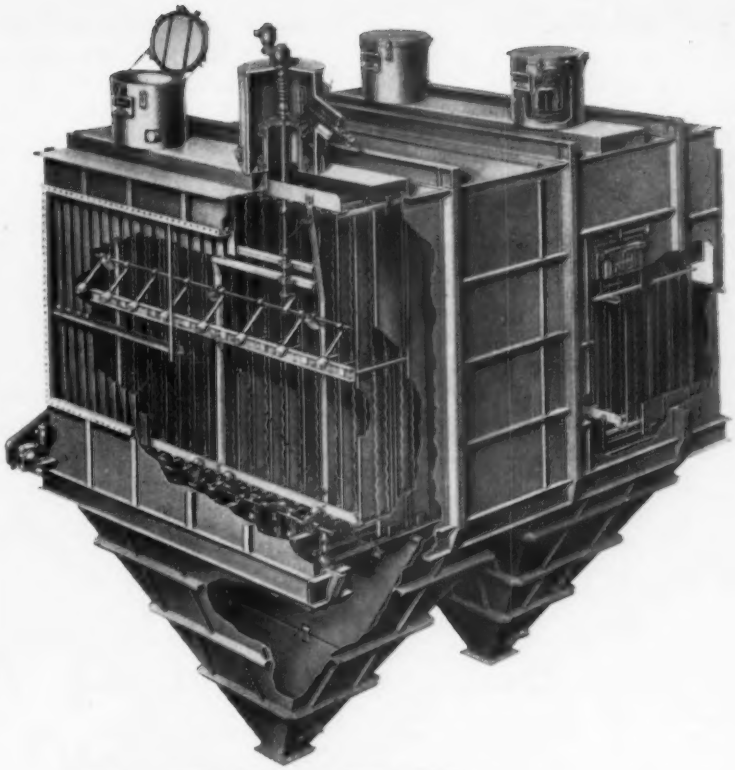
For more data circle No. 71 on postcard, p. 143

Drys Compressed Air

Drying equipment handles compressed air or other gases with complete automation. Planned particularly for instrument air service, the unit features simplicity and modern, functional design. Parts are inter-



changeable and the few moving parts are easily accessible. This simplifies maintenance. Working on a six-hour cycle, the unit absorbs moisture, heats for regeneration and cools with no attention required—



DECADE

OF OPERATION PROVES MAINTENANCE OF BUELL 'SF' PRECIPITATORS AVERAGE LESS THAN 2%

In 10 years of selling 'SF' electric precipitators, the number of replacement parts ordered from Buell has amounted to only 1.17% of the total sales! Even on emitting electrodes, usually the most vulnerable part of a precipitator, replacement has amounted to less than 1% of the original number installed. What do these extremely low percentages mean? Exceptionally low maintenance costs, for one thing, continuous high-efficiency operation, fewer shutdowns and process interruptions. Buell self-tensioned emitting Spiralectrodes eliminate vibration found in weight-tensioned wires. Buell's low maintenance precipitators will provide you with the most satisfactory operating results. They're backed by 25 years of experience in dust collection, with the practical know-how gained on hundreds of installations. Write for descriptive literature. The Buell Engineering Co., Inc., Dept. 42-C, 123 William St., N. Y. 38, N. Y. Northern Blower Division, 6404 Barberton Ave., Cleveland, Ohio.

buell®

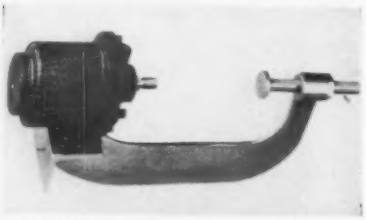
Experts at Delivering Extra Efficiency in Dust Recovery Systems.

except occasional lubrication. Adequate instrumentation permits checking operation at a glance. (Pittsburg Lectrodryer Div., McGraw-Edison Co.)

For more data circle No. 72 on postcard, p. 143

"C" Clamps

Tailored to any industrial requirement, two lines of C-clamps are available. They are: A heavy-duty series for exceptional strength and durability, and a low-cost economy series for average applications. The clamps come with a manual sleeve valve or with an integral

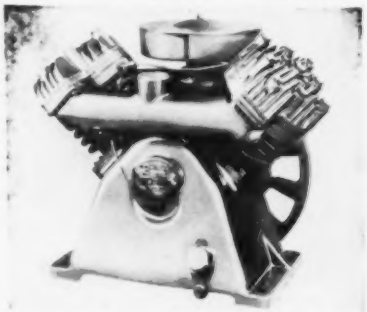


solenoid valve for automation applications. All clamps are available with a number of optional clamping ends. The line of clamps has maximum openings of 7, 8, and 9 in. (Airmatic Valve, Inc.)

For more data circle No. 73 on postcard, p. 143

Air-Cooled Compressor

An X-shape design of an air-cooled compressor virtually eliminates vibration and reduces maintenance. A short-stroke design with reduced cylinder overhang, and the use of a wide-stance base achieves the X-shape. Each component of the compressor is related to the operating efficiency of the total compressor. The one-piece compressor



connecting rod simplifies maintenance and eliminates the need to assemble and fit bearings, bushings, and shims. The unit is available as a belt-driven model, or with the compressor and the motor forming a mono-block arrangement. Motors are available for single phase, 60 cycle, 115/230 v, or 3 phase, 60 cycle, 220/440 v. (Worthington Corp.)

For more data circle No. 74 on postcard, p. 143

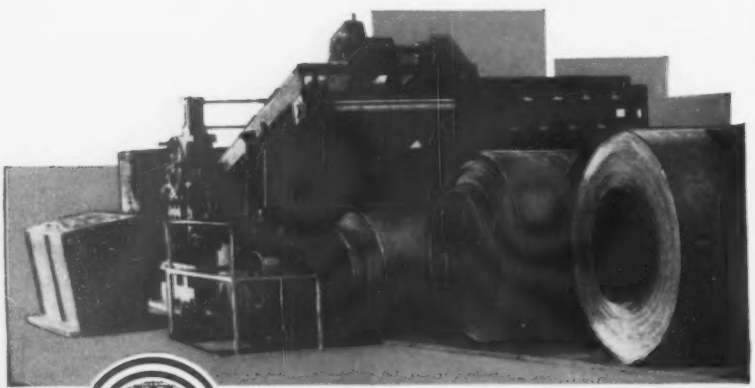
Oxygen Unit

Eliminating the heavy steel supply cylinders, a transportable oxy-

gen unit produces an unlimited supply of oxygen from the atmosphere. The device draws air from the atmosphere, filters out contaminants, extracts oxygen and delivers the gas at about 5-psi pressure, in less than

Stamco heavy gauge feeding equipment and trimmers save you money.

Saves operating time and increases production. A single operator can quickly feed gauges up to ½" thick with Stamco electrically and hydraulically operated coil strippers and unwind equipment.



Stamco, Inc.
New Bremen, Ohio, U. S. A.

Slitting and Coiling Lines • Cut-To-Length Lines • Flying Shear Lines • Power Squaring Shears • Automatic Resquaring • Corrugating, Culvert and Steel Mill Equipment

one minute after activation. Units are gasoline or battery powered for field operations. (Aerojet-General Corp.)

For more data circle No. 75 on postcard, p. 143

Carry-All Truck

A walk-or-ride, carry-all truck serves as an inter-plant delivery truck, order selection or baggage truck. The truck comes with 12- or 24-v electric systems and with overdrive for long, fast hauls. Adaptable to a variety of plant applica-

tions, it is available in capacities ranging from 2000 to 10,000 lb. The shelving is removable to allow space for larger packages, if necessary. Removal of the seats on the rear platform converts the truck into a personnel carrier. (Lewis-Shepard Products, Inc.)

For more data circle No. 76 on postcard, p. 143

Testing Machine

Interchangeable "load cells" are a feature of a low-load, tensile and compression testing machine. The machine allows the use of four different load cells, each providing a different maximum load (100, 200,

600, and 1000 lb) with gages and graduations to match. The 115-v electric, motor-powered operating mechanism produces fast, smooth operation. Tensile test specimens up to 3/16-in. thick, 1-in. wide, and 12-in. long, and compression test specimens up to 4-in. diam and 6-in. high can be accomodated. (Detroit Testing Machine Co.)

For more data circle No. 77 on postcard, p. 143

Wiring Enclosures

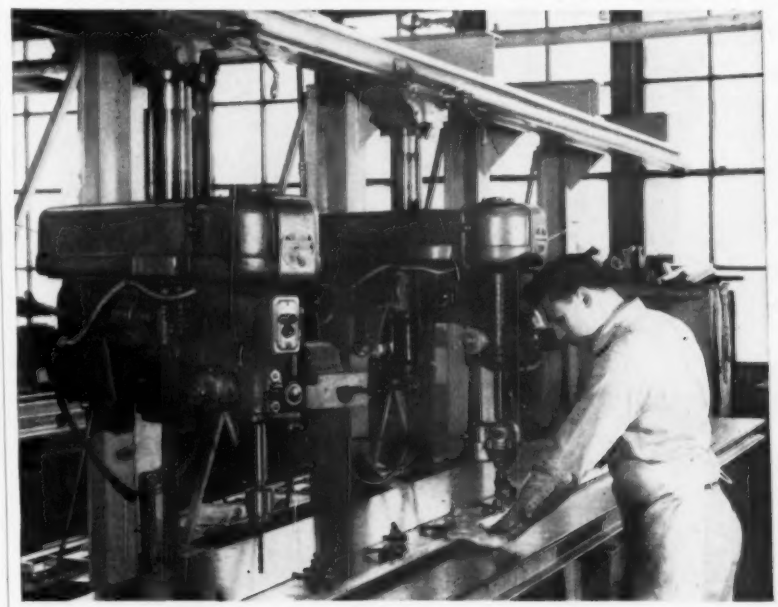
Custom-tailored wiring enclosures feature: special knockouts, piercings, drillings, studs, screws and conduit hubs, special hardware, latches and locking devices. Other features can include: welded seam construction, gasketed covers and positive pressure-type clamps for rain-tight, dust-proof applications. Electrical components may be preassembled. (Keystone Mfg. Co.)

For more data circle No. 78 on postcard, p. 143

Clean Aluminum Alloys

A powdered, easy to handle, acid compound serves as a cleaner, brightner and phosphatizer for aluminum and its alloys. It's used as a solution with water. The ratio is

WALKER-TURNER 20″ Drill Press



Cuts costs of drilling and tapping

Mounting two standard Walker-Turner overhead 20″ drill presses on a crane rail provides a low cost, special set-up to speed production at Kidde Textile Machinery Corporation, Bloomfield, N. J. One operator drills and taps 400 holes an hour in strips up to 200 inches long. Use of a multiple head attachment on one drill press permits simultaneous drilling of 5 holes of less than ¼″ diameter.

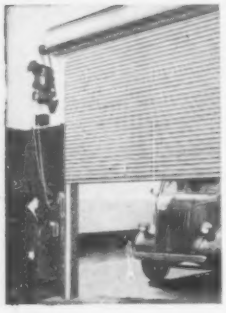
Like all W-T "Light Heavyweight" metalworking tools, these fast, accurate, versatile drill presses pay their own way under the most rugged, production line use. Your Walker-Turner Distributor (listed under "TOOLS" or "MACHINE TOOLS" in the Yellow Pages) can help you match the tool to your needs. He carries a complete line of 20″, 17″, 15″ and the new 14″ Hi Speed drill presses.

Visit Walker-Turner in Booth No. 2236 at the A.S.T.E. Show

FREE CATALOG— Shows the full line of W-T metalworking tools and accessories. Write: Rockwell Manufacturing Co., Walker-Turner Division, Dept. WC-28, 400 N. Lexington Ave., Pittsburgh 8, Pa. In Canada: Rockwell Manufacturing Co. of Canada, Ltd., Guelph, Ont.

WALKER-TURNER
"LIGHT-HEAVYWEIGHT" MACHINE TOOLS
another fine product by
ROCKWELL

Send *Today* for this New Data on *Upward-Acting* Doors for Every Need



Kinnear originated the interlocking slat door

Get full details on this complete line of time-saving, cost-slashing doors. They add highest efficiency to space-saving, coiling upward action. Kinnear offers a wide choice of flat and curved slats—fabricated of aluminum, zinc-coated steel, or other metals. They fit every need, from small counter openings to largest doorways. Slat sizes range up to the seven-inch "Goliath" slat at the extreme left, above — maximum protection against wind, weather, intrusion or vandalism!

Zinc-Coated *Dual* Protection
Kinnear Steel Rolling Doors feature extra-heavy hot dip galvanizing! 1¼-ounces of pure zinc per square foot of metal (in accordance with ASTM standards). And Kinnear's special phosphate treatment makes this zinc surface ready *immediately* for thorough paint grip.

Make sure you get this complete door guide — check it *now!*

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Saving Ways in Doorways

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Offices and Agents in All Principal Cities

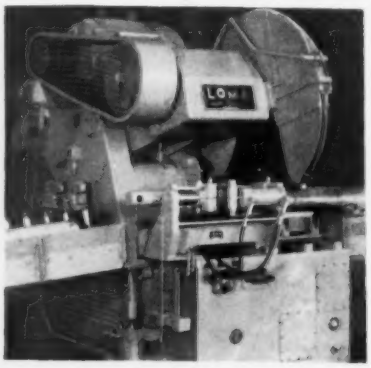
NEW EQUIPMENT

4-8 oz to a gallon of water. This solution can be handled in steel tanks and the heat necessary to raise it to the usable temperature of 180°-200°F can be supplied through steel steam coils. Variation in immersion time produces either a clean, bright surface or one which provides a good paint base. (Clarkson Laboratories, Inc.)

For more data circle No. 79 on postcard, p. 143

Billet Cutoff Machine

Designed to cut aluminum-alloy billets up to 16-in. diam, an automatic cold-saw machine has a 48-in. diam sawblade. The blade is driven by a 75-hp motor at speeds between 4000 and 8000 fpm. The



machine features a tilt arm, and the cut is effected through a downward movement of the sawblade. Complete automation is obtained by operating the saw in conjunction with mechanical - handling equipment. (Loma Machine Mfg. Co.)

For more data circle No. 80 on postcard, p. 143

Thread Miller

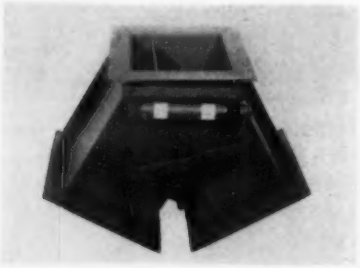
A device thread-mills any type of plastic material and metal, internally or externally, including beryllium, titanium, and stainless steel. Thread milling is completed with one pass, without overheating the material. Coolants may be used, if desired. Within 4 to 5 minutes, one person can set up the miller on any 9-to-20 in. screw-cutting lathe. A wide range of cutters is available for cutting any 60°, Acme, square thread or even multiple threads, from ½ to 9 in. for internal thread-

ing, and from 1/32 to 9 in. for external threading. Cutting capacity ranges from 4 to 200 threads per in. (The Fen-Thread-Machine Co., Inc.)

For more data circle No. 81 on postcard, p. 143

Bifurcating Gates

Special gates divert streams of bulk material from one direction to another. These gates feature one removable side for easy cleaning. Standard size range is from 6-16 in. The units are available in stain-



less steel, galvanized or carbon steel. The flop-gate shaft rides in self-aligning bronze bearings which can be mounted outboard with inboard mechanical seals. (The Bucket Elevator Co.)

For more data circle No. 82 on postcard, p. 143

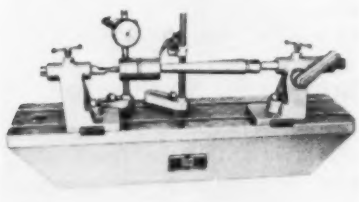
Flux Additive

A fluxing additive acts as an adhesive to keep the flux close to the base metal. It eliminates the critical time between fluxing and hot dipping. The additive may be used in any aqueous flux bath. (Westinghouse Electric Corp.)

For more data circle No. 83 on postcard, p. 143

Bench Center

A bench center and surface plate provide an accurate way of inspecting all types of work. Work pieces mount between centers, in V-rests



or on precision-ground surface plate. A dial indicator shows runout as work rotates by hand. Tail-

RANSBURG

What Would Paint Savings Like This* Mean in YOUR Finishing Department?

Quality is all important in the production of fine Metalcraft furniture by George Koch Sons, Inc., Evansville, Indiana.

That's why they use the Ransburg Electrostatic Hand Gun to apply a uniform clear coating on their brass-plated furniture. The protective coating is baked on. Although the bulk of their present production is in the popular brass line, they still paint the metal furniture in a variety of colors with the Hand Gun.

Painting is CLEANER ... QUICKER ... CHEAPER *with the Ransburg Electrostatic Hand Gun.*

These chairs and table are typical of the Koch line of metal furniture.

*10 GALLONS OF PAINT NOW DOES THE JOB WHICH FORMERLY TOOK 30 GALLONS

On one item—a TV table—they formerly used 30 gallons of enamel to coat 1000 units by combination dip and air spray method. Now—with the Ransburg Electrostatic Hand Gun, they paint 1000 tables with only 10 gallons. And, they get a better, more uniform coating, too.

NO REASON WHY YOU CAN'T DO IT, TOO!

See how the Electrostatic Hand Gun can save time ... paint ... and cut costs in YOUR finishing department. Or, if your production justifies, it'll pay you to investigate Ransburg's automatic electrostatic spray painting equipment. Write for our No. 2 Process brochures which show numerous examples of modern production painting in both large and small plants.

RANSBURG

RANSBURG
Electro-Coating Corp.
Box-23122, Indianapolis 23, Indiana

stocks can be positioned any place on the T-slot. Four indicator stands are standard for the inspection unit. They can be positioned any place on the surface plate. The distance between centers is 22 in., centerline height from centers to plate is 4.130 in. and diameter of work over surface plate is 8¼ in. (K. O. Lee Co.)

For more data circle No. 84 on postcard, p. 143

Deburring Tool

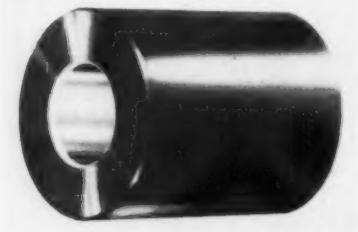
Developed for all applications involving irregular-hole surfaces, a deburring and chamfering tool automatically follows hole configuration. It produces a chamfer of relative uniformity and symmetry. Operation is very fast, requiring neither jigs, fixtures, nor skilled operators. The deburring operation may be performed as parts progress along a conveyor line, or while palletized

between successive machine stations. Use of the tool increases production at less cost, higher standards of work quality, and longer tool life. (Nobur Mfg. Co.)

For more data circle No. 85 on postcard, p. 143

Improve Gun Drilling

Precision gun drilling requires a maximum of 0.0002-in. clearance. In many applications even closer clearances are required. A line of solid carbide bushings are made to exact clearance requirements and hold true to size—up to 50 times



longer than steel. The rigid-carbide support improves cutting-tool performance, extends tool life and cuts inspection time, down time and scrap. (S & E Machine Products, Inc.)

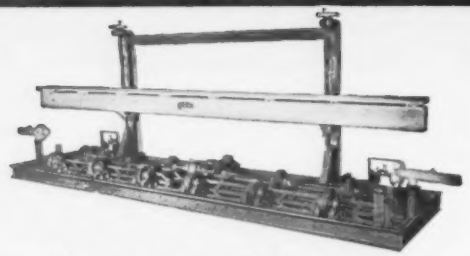
For more data circle No. 86 on postcard, p. 143

Magnetic Separator

A non-electric magnetic bar removes iron fines or small tramp iron, or it holds or controls parts in handling and conveying operations. The unit is 1 x 1 in. in cross section. It comes in standard widths of 4 through 72 in., in 2-in. incre-

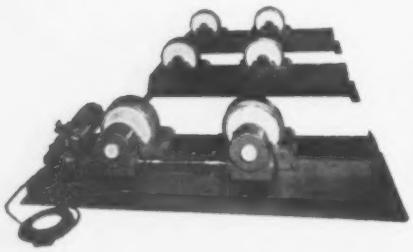
WEBB TANK PRODUCTION MACHINERY

REED TRACK SUPPORTS For Automatic Welding Head Carriages



Increase production — use this fixture on 4' to 12' diameter work. Welding track is 24' to 34' long. Powered vertical adjustment is available for all models. May be used with your present turning rolls, welding positioners, special jigs for straight seam work, or portable type rolls illustrated below.

REED Portable Type TURNING ROLLS



For manual or automatic welding and other operations requiring rotation of a cylindrical vessel. Capacities range from 3 tons to 75 tons; larger units built to special order. Powered by electric motor with variable speed transmission. Readily portable, they may be used free or anchored to the floor as desired.

Horn Type Fixtures | Cylinder Flange Offsetters | Assembly Fixtures | Unit Type Turning Rolls | Portable Turning Rolls | Automatic Welding Track Supports

FOR ILLUSTRATED LITERATURE WRITE DEPT. E

Since 1881 THE WEBB CORP.

REED EQUIPMENT DIVISION

WEBB CITY, MO., U.S.A.

ments. The magnetic unit is supplied with non-magnetic stainless-steel mounting brackets adjustable from ¼ to ½ in. in depth. The brackets are removable for stud mounting. (Eriez Mfg. Co.)

For more data circle No. 87 on postcard, p. 143

Cycle Counter

Counting up to 127 cycles, a portable counter totals cycles of weld time to an accuracy of ±¼ cycle. The unit is light in weight

and small enough for one-hand operation. An internal battery provides power. No power connections are required. (Instrument Control Co.)

For more data circle No. 88 on postcard, p. 143

Force Gage

Designed for easy hand operation, a precision force gage comes with six stainless-steel attachments for the accurate measurement of

compression and tension forces. Using a compensated spring mechanism and a dial indicator with 140 divisions, the 14,000-g capacity indicator has an overall accuracy of ½ of 1 pct of full scale. This is equivalent to ±70 g. The device can either follow all load fluctuations, or hold the maximum reading. The indicator is ruggedly constructed and housed in a cold-rolled case. (Hunter Spring Co.)

For more data circle No. 89 on postcard, p. 143

Gives Grinder Light

A safety attachment for surface grinders serves as a sighting light. This eliminates makeshift back-of-the-wheel lighting. The unit's body is high-strength aluminum alloy, faced with opalized, glare-free glass panel. Two 40-w bulbs provide a bright, non-glare light. (Cutlas Tool & Mfg. Co.)

For more data circle No. 90 on postcard, p. 143

Resin-Based Paste

An epoxy-resin-based paste material features ease of mixing and application, fast curing, dimensional

On Controlled Atmosphere Furnaces, Too

ABOVE ALL...

Spencer blowers atop Swindell-Dressler electrically heated portable furnaces for annealing electrical steels in recirculating protective atmospheres at high temperatures.

SPENCER Blowers

Where requirements are critical, you'll usually find SPENCER blowers, preferred because of their:

COMPLETE DEPENDABILITY—Simple, rugged construction (lightweight impellers the only moving parts) greatly diminishes danger of breakdown . . . lessens likelihood of service being needed.

NON-CONTAMINATION FEATURE—Complete absence of internal lubrication (all bearings are outside of casing) means atmosphere cannot become contaminated by oil.

COMPACTNESS—Solidly built . . . with no unnecessary bulk.

ALSO MANUFACTURERS OF:

PNEUMATIC CONVEYING SYSTEMS

INDUSTRIAL VACUUM SYSTEMS

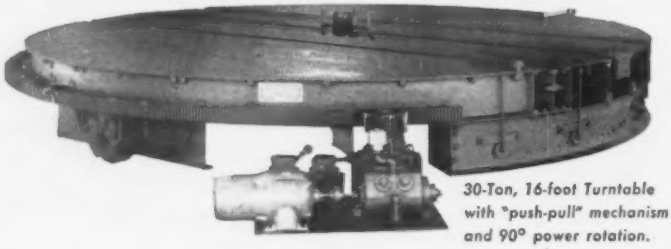
PORTABLE VACUUM CLEANERS

Request Catalog No. 126C.

The SPENCER TURBINE COMPANY
HARTFORD 6, CONNECTICUT

for turnaround convenience

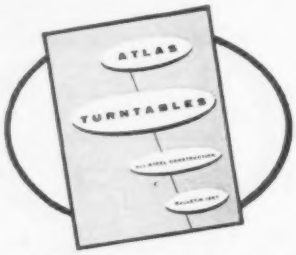
ATLAS turntables



30-Ton, 16-foot Turntable with "push-pull" mechanism and 90° power rotation.

Atlas turntables are made to customer specifications in any size and capacity; for manual or power rotation. Either flush or raised rail arrangement can be provided, with rail size and gauge to match existing track.

Request



Bulletin 1297

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ATLAS CAR & MFG. COMPANY

1140 IVANHOE ROAD

CLEVELAND 10, OHIO

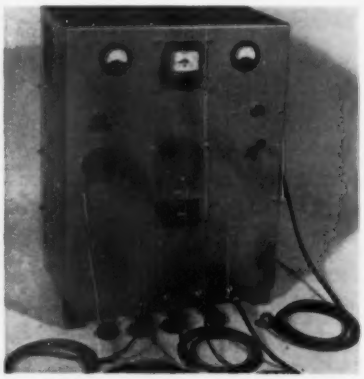
NEW EQUIPMENT

stability, and adhesiveness. The paste clings firmly to vertical, horizontal, and circular surfaces despite high temperatures or many conditions adverse to other materials. The epoxy material finds use in pattern shop and foundry. It can be used in pattern making for building and duplicating male or female parts, and is a good fillet material; it may be used to repair or rebuild damaged patterns. (Ren Plastics, Inc.)

For more data circle No. 8 on postcard, p. 143

Portable Power Pack

A portable power pack has stepped-up current capacity for handling the rapidly increased volume of plating work in the machine-tool, mining-machinery and marine-engine fields. The unit operates on 220 v, 60 cycles, single phase. It has an output of 0-50 amp at 0-30 v with stepless voltage control and a special ampere-hour meter having 0.01 amp-hr divisions. The power pack is 32 x 24 x 18 in. Weight, complete with all leads, is 227 lb. (Sifco Metachemical, Inc.)



For more data circle No. 9 on postcard, p. 143

Spring Tester

A motor-driven spring tester uses a heavy pendulum hung on knife edges. This arrangement allows high-precision checking of large compression and extension springs. The capacity is ¼ to 550 lb, with spring lengths up to 20 in.; spring diameters up to 5 in., and speed of testing up to 600 tests per hour. An optical system magnifies the

load and projects it into an illuminated glass plate containing tolerance markers. Adjustable steps permit the testing of loads at 1, 2, or 3 different lengths in the same set up. (The Carlson Co.)

For more data circle No. 10 on postcard, p. 143

Strain-Gage Calibrator

With an instrument accuracy of ±0.05 pct of reading, a strain-gage transducer calibrator gives fast checking. The device consists of a digital indicator with a remote cable-connected case. The remote case contains circuitry to allow input of any of six separate transducers, through a six-point selector switch, along with individual zero

and span pots for each channel. Span adjustments vary through a range of 1.50 to 3.03 millivolts per v. The device has a base range of 0 to 20 pct with four add-to reading ranges of 20, 40, 60, and 80 pct for a total range of 100 pct. Use of this instrument makes possible the check of all electrical characteristics of a transducer. (Gilmore Industries, Inc.)

For more data circle No. 11 on postcard, p. 143

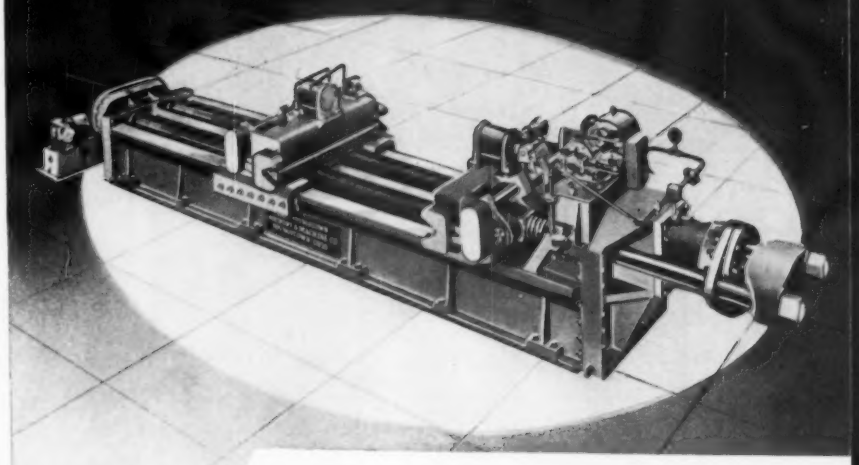
Bonded-Film Lubricant

For industrial applications, the use of a bonded-film lubricant eliminates extensive and costly surface preparation. It is permanently effective when dried at room temperature. The lacquer-type material applies easily to metals, glass, or plastics by spraying, dipping, or brushing. Features of the lubricant are: permanence combined with high resistance to wear and contamination, solvent resistance and hardness increase with baking at moderate temperatures, and initial

"YOUNGSTOWN"

New Carriage-Type Design

STRETCHER LEVELER



a small difference in design makes a big difference in RESULTS...

FAST POSITIONING RUGGED CARRIAGE

WEDGE TYPE HEADS with WAFFLE TYPE GRIPPER JAWS assure flatness of sheet-ends.

Rugged Three Way fabricated Steel Bed insures utmost rigidity.

- *CONSERVES VALUABLE FLOOR SPACE*
- *SPEEDS STRETCHING OPERATION*
- *AIDS QUALITY CONTROL*

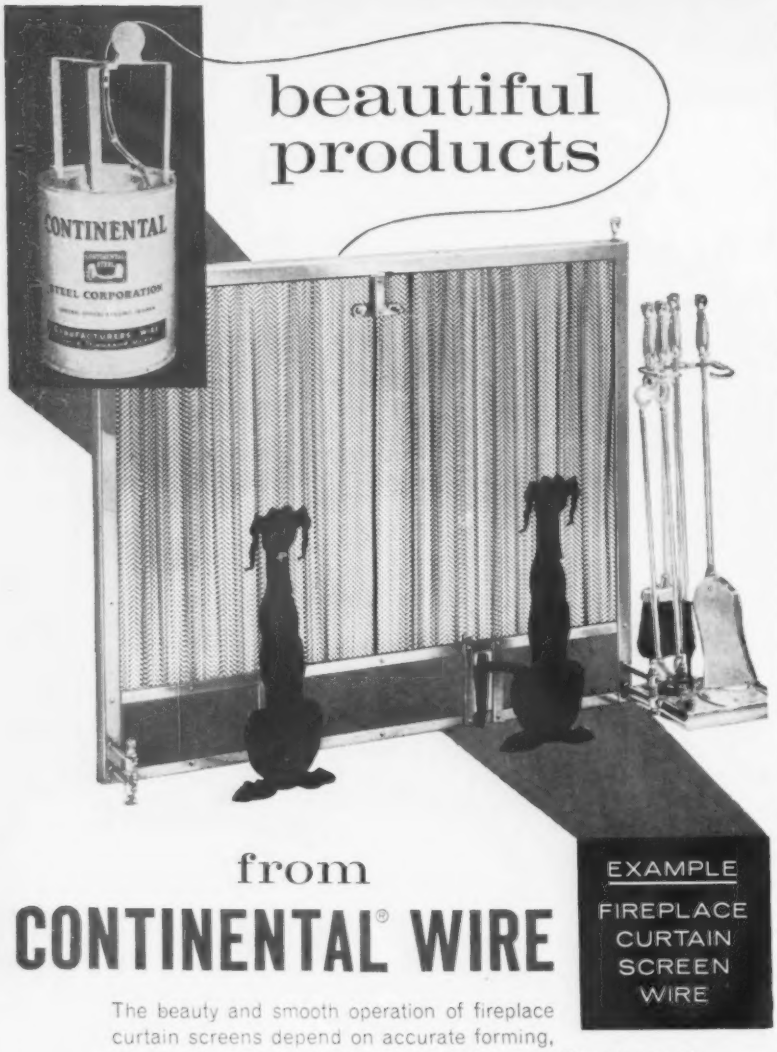
The Hydraulic Stretcher Leveler pictured is 800,000# Capacity capable of stretcher leveling mild cold rolled sheets 30″ to 62″ wide, 30″ to 168″ long, up to .180″ thick in either single or multiple sheets.

A complete range of sizes . . . built from 10,000# for aluminum extrusions to 2,000,000# for stretching plate. New performance throughout a long life of service is assured by traditional "YF&M" rugged construction. Write for Complete Information.

The Youngstown Foundry & Machine Company

Serving Industry Since 1885

Youngstown 1, Ohio



from
CONTINENTAL® WIRE

The beauty and smooth operation of fireplace curtain screens depend on accurate forming, even spacing, and neat appearance of the mesh. The wire used must be of correct temper, diameter and finish. Uniformity of these properties is of prime importance. Leading fireplace equipment makers choose Continental Wire because it possesses these features dependably, in coil after coil. The ability to take intricate forming is an important reason why Continental Wire is specified for scores and scores of other products made with wire. Continental Curtain Screen wire, 19 gauge through 20 gauge inclusive in size, is available in 500 pound to 650 pound catchweight single length coils packed in Leverpac Drums for faster weaving with less down time, cleaner handling and better storage. For wire in practically any size, finish, temper or analysis, in low or medium low carbon steels, see Continental first!

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PRODUCERS OF: Manufacturers' Wire in many sizes, tempers and finishes, including Galvanized, KOKOTE, Flame-Sealed, Coppered, Tinned, Annealed, Liquor Finished, Bright and special shaped wire. Also Welded Wire Reinforcing Fabric Nails, Continental Chain Link Fence, and other products.

NEW EQUIPMENT

lubricity increase upon use. (Poly Chem)

For more data circle No. 12 on postcard, p. 143

Cleans and Burnishes

Self-tumbling steel, brass or copper parts can be prepared for barrel plating by a simple process built around a combination cleaning-burnishing compound. The compound is supplied as a white dust-free granular powder. It mixes readily with water. The work is loaded in an oblique barrel, with the fluid mixture, and tumbled for 5-30 minutes. This operation cleans and burnishes at the same time. The workpieces require only an acid dip and rinse prior to plating. (Gumm Chemical Co., Inc.)

For more data circle No. 13 on postcard, p. 143

Arc-Welding Flux

For single- and multiple-pass work up to 1200 amp, a new submerged arc-welding flux has the ability to sustain high-travel speed with an X-ray quality deposit. It will work through moderate mill scale or rust on light- or heavy-gage material; the slag is easy to remove. When used with mild-steel welding wire, typical physical properties are: yield, 59,000 psi, tensile strength 71,000 psi, elongation, 30 pct, and reduction of area, 64 pct. (Hobart Bros. Co.)

For more data circle No. 14 on postcard, p. 143

Band-Saw Blade

Made from a double-carbide alloy, a band-saw blade gives high-production performance. The new alloy, used for the blade, provides the hot hardness and abrasion resistance which permit use at higher speeds and feeds on standard carbon band-saw machines. This results in faster cutting. The high production and cutting rate increase the range and types of materials which can be cut on these band-saw machines, extend blade life, reduce down time, and minimize tool risk. (The Capewell Mfg. Co.)

For more data circle No. 15 on postcard, p. 143

The Iron Age Summary

More Cancellations Hit Market

Wave of cancellations is bringing on the dropoff in steel operations ahead of schedule.

Strict inventory control is also taking effect, but momentum will keep the buildup going into April.

▪ The dropoff in steel operations is advancing faster than expected. An increasing number of cancellations and a low rate of incoming orders are leaving holes in mill schedules.

Mills will soon have to gear their operations to the rate of orders. When that time comes, operating rates will fall into the low 80's.

Letup in May—As it looks now, steel operations may continue in the 90's through April. But in May and June, the rate may run in the low 80's or even dip lower.

During this period, the rate of operations will vary between companies as competition stiffens. This will depend on proximity to the markets, customer relations, and product mix.

Inventory Controlled — Strict inventory control is already a fact, but momentum will carry inventory buildup into the second quarter. But, like most earlier predictions, the estimate of inventory buildup is turning out to be much lower than expected.

The new wave of cancellations is centered in the auto industry as plants are cutting out overtime, and, in some cases, closing up for short periods while dealer inventories are brought into balance.

Small Car Impact—Steel industry is now feeling the effects of the new small cars on steel demand. The compacts are now taking 20 to 25 pct of the total market and some estimates indicate a compact takes possibly 800 lb less steel than a larger model. Projected over the year, this means a sizable loss of steel on paper.

Another short-term factor hitting the market is the weather. Unseasonable cold and blizzards throughout much of the nation have hit auto and other consumer durables sales in addition to lowering industrial activity generally.

Imports Hit — Imported steel is also having an impact on the market. Orders for foreign steel can not be cancelled or deferred. Deliveries of imported steel reached their peak at the critical time and are hurting the domestic market more than total tonnage would indicate.

Another market indicator is the fact that semi-finished and other low profit steel products are now readily available. This means that orders for higher-profit finished products are not coming up to expectations and mills are willing, even eager, to move low profit items.

Recovery Effects — One reason for the earlier timing of the drop is the better-than-expected shipments of steel. Shipments exceeded even the most optimistic predictions. In December, domestic mills made 11.9 million ingot tons and shipped 8.2 million tons. This was about 1 million tons over estimates.

In addition to adding about 1.5 million tons to steel production, the quick recovery had the effect of putting industry back on its feet faster than expected.

Steel Output, Operating Rates

Production	This Week	Last Week	Month Ago	Year Ago
(Net tons, 000 omitted)	2,647	2,645	2,687	2,371
Ingot Index				
(1947-1949=100)	164.8	164.7	167.3	147.6
Operating Rates				
North East Coast	90.0	90.0*	96.0	83.0
Buffalo	99.0	99.0	99.0	95.0
Pittsburgh	97.0	96.0*	97.0	84.0
Youngstown	85.0	87.0	89.0	71.0
Cleveland	103.0	97.0*	101.0	83.0
Detroit	100.0	102.0*	100.0	92.0
Chicago	95.0	96.0*	96.0	87.0
Cincinnati	102.0	104.0	105.0	83.0
St. Louis	96.0	97.0*	93.0	102.0
South	87.0	86.0*	87.0	79.0
West	87.0	88.0*	90.0	87.0
U. S. Rate	92.9	92.8	94.3	83.7

*Revised
Source: American Iron And Steel Institute

Prices At a Glance

(Cents per lb unless otherwise noted)

	This Week	Week Ago	Month Ago	Year Ago
Composite price				
Finished Steel, base	6.196	6.196	6.196	6.196
Pig Iron (Gross ton)	$66.41	$66.41	$66.41	$66.41
Scrap No. 1 hvy (Gross ton)	$33.83	$34.50	$40.58	$41.17
No. 2 bundles	$21.83	$21.83	$26.50	$29.00
Nonferrous				
Aluminum ingot	28.10	28.10	28.10	26.80
Copper, electrolytic	33.00	33.00	33.00	31.50
Lead, St. Louis	11.80	11.80	11.80	11.30
Magnesium	36.00	36.00	36.00	36.00
Nickel, electrolytic	74.00	74.00	74.00	74.00
Tin, Straits, N. Y.	100.625	100.00	100.875	102.00
Zinc, E. St. Louis	13.00	13.00	13.00	11.00

Automatic Weighing Gains Favor

More industrial scale buyers are discovering the value of complete weighing systems.

Sales of standard scales are also good as users modernize and improve equipment.

▪ More buyers are realizing the advantages of automatic industrial scales. This trend is helping trigger greater sales of scales.

Consumers now regard the scale as more than a weighing device. Manufacturers are designing and selling complete weighing systems, which may include electronic controls and data processing equipment.

Speed Counts—In many cases the installation is built right into production or shipping lines for fast, in-process weighing.

Commenting on weighing trends one scalemaker says, "The greatest impact on the market is caused by developments extending weighing control equipment for use with process machinery and a speed up in obtaining weights."

Another says, "There are and will be improved weighing techniques with improved materials and handling devices used for weighing automatically."

Good Year Predicted—But even with these trends, the demand for standard line scale is strong, scale makers say. With the emphasis on holding down costs, users are discovering scales can be "money makers." Worn-out and obsolete weighing equipment is being replaced.

All this adds up to a good year for scalemakers. The industry expects a record volume in 1960, topping the previous high set in 1959. Sales of industrial scales will be an important factor in this bid for a new record.

Getting Stronger — Momentum has been building up in scale sales since mid-1958, the Scale Manufacturers Assn. reports. Each quarter in 1959 was better than the preceding one. And the final quarter was 14.6 pct above the former record for a three-month period.

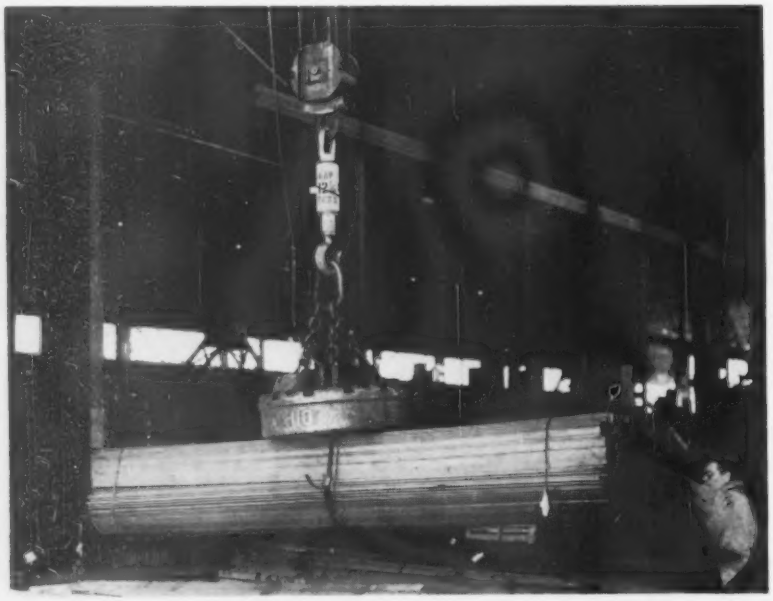
Sales continued strong into this year. Manufacturers believe the present high level will last through the year, the association says.

Price Stability—The outlook for scale buyers is also encouraging. As scale designers are going all-out to provide advanced equipment. Right now deliveries are good. And there's little prospect of price increases.

Among manufacturers surveyed by The IRON AGE, the majority expect stable prices for 1960. "There probably won't be any increases for about a year," one scalemaker says. "We are trying to hold present price levels," another comments. A few see a chance for price advances, mainly if steel prices go up.

Delivery Promises—The majority questioned report sales are increasing and they expect '60 sales to top '59 levels for their companies. The scale builders add, however, that backlogs are down from year ago levels. As a result deliveries are good.

Based on replies to the survey, here are some delivery promises quoted by the manufacturers: Bagging and bulk scales—5 weeks; portable scales—2 weeks; truck scales—4 weeks; standard railroad track scales—8 weeks.



STRONG SALES YEAR: That's what scalemakers predict as buyers modernize and improve weighing equipment. (Fairbanks, Morse & Co. photo)

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Special SHAPES

Save Time—Cut Cost

Order the exact shapes needed. Any special shape—as well as all standard shapes—drawn to the exceptionally close tolerances that have made MOLTRUP the quality name in steel for over 65 years.

Prompt Delivery...

Your order or request for quotation will receive immediate attention. Please include blueprint and specification of special shape or shapes desired. Shipments direct from our plant.

Precision Products...

Cold Drawn Carbon, Alloy, and Leaded Steels — Screw Stock — Key Stock—Turned and Polished Shafting—Flattened, Ground and Polished Plates — Foundry Pattern, Core and Bottom Plates.

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New York, N. Y. Syracuse, N. Y. Cincinnati, O.
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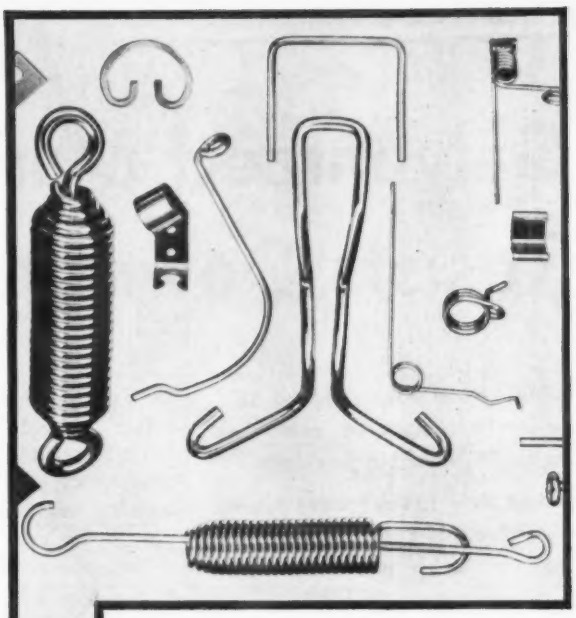

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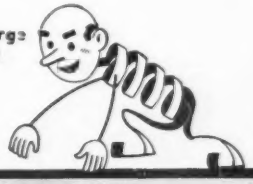

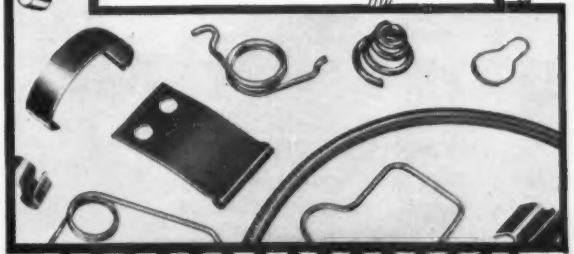

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Galvanized Market Resists Downtrend

Mills have been shipping at a better-than-expected rate, but they still have big backlogs.

And they haven't been hit by the volume of cutbacks reported for most other products.

■ Growing demand for galvanized steel sheet isn't confined to the U. S. Canadian capacity for the production of continuous galvanized steel sheets will double during 1960, according to the Committee on Galvanized Steel Sheet Research.

The Committee estimates that Canada's galvanizing capacity will rise to 480,000 net tons this year. Behind the capacity boost are increasing demands for galvanized steel sheets, particularly for use in commercial, industrial, and agricultural construction and manufacturing.

Demand Runs High — In the U. S., if there has been any current easing of galvanized supply, it hasn't been due to a significant reduction in demand, claims a Pittsburgh mill.

The mill's rate of order entry is as high as it was three months ago. And there has been no reduction in the backlog of galvanized orders from that time.

What has happened is this: The order situation has become more orderly.

There have been some schedule adjustments. And a decline in foreign demand shows domestic users aren't reaching out for imported steel as much. This is because domestic mills have been able to offer more galvanized than expected.

"Turning Down Orders" — But better - than - expected deliveries haven't weakened galvanized sales appreciably. Reports from Cleveland say mills in that area are sold out through mid-year.

And galvanized producers haven't been hit by the volume of cutbacks reported for most other products. Says one mill executive: "We're still turning down orders every day."

Sheet and Strip — Cancellation and stretchout orders have finally hit the **Cleveland** market—the last major area to report them. But outright cancellations were few and tonnages were small. And the tonnages released were grabbed by other users who have had little success in rebuilding inventories. Automotive and other users are taking their time before committing themselves to May and June orders. An exception to this comes from **Detroit** where a large automotive division has placed some orders as far out as July. But reports from this area say some carmakers will make their last purchases of steel for 1960 models in April and May. This will probably mean an early and lengthy changeover period.

PURCHASING AGENT'S CHECKLIST

Sales of numerically-controlled machine tools should skyrocket in next three years. P. 79

Trend to vacuum melting continues to meet present and future needs of missilemakers. P. 87

New trunnion-transfer machine is designed to make a "family" of parts rather than just one. P. 107

Service Centers — Joseph T. Ryerson & Son, Inc., has changed over warehouses in seven more cities to its new pricing system (IRON AGE, Feb. 25, P. 26). This makes a total of 11 cities where Ryerson warehouses use the new price structure based on new item extras and order discounts. Latest cities to be added to the list are: Chicago, Cincinnati, Detroit, Milwaukee, Philadelphia and New York. Cities where the new schedule had been installed previously are: Buffalo, Cleveland, Pittsburgh and St. Paul.

Pipe and Tubing—Just about all pipe products are affected by a rapid softening of markets. New orders for standard pipe are trailing far behind current production and shipments from **Pittsburgh** mills. Once big backlogs have been whittled down, at least one mill is ready to reduce production schedules. Only the need to rebuild mill stocks will delay cutbacks. But sometime this month production will have to be brought into line.

Mills are already offering delivery in 7 to 10 days; and most expect a period of day-to-day operations before long. Buttweld pipe has already become a day-to-day business on the **East Coast,** according to one mill. And customers are showing little interest in linepipe. And there is little or no demand for oil country products. Oil producers overstocked before the strike. Some say they actually increased inventories during the strike as they bought pipe and casing they didn't need from suppliers not on strike.

Bars—Bar mills are preparing for a softening of demand before long. An **East Coast** mill found demand exceeded supply because of a shortage of ingots. But it was able to fill orders from a mill in the **Pittsburgh** district. Bar mills in the **Midwest** are expected to continue full operations during March, but this is to be followed by cutbacks of 20 pct. Mills continue to get cancellations. And one midwestern user is said to have dropped an entire month's planned purchases of hot-rolled bars.

COMPARISON OF PRICES

(Effective March 8, 1960)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price changes from previous week are shown by an asterisk (*).

	Mar. 8 1960	Mar. 1 1960	Feb. 9 1960	Mar. 10 1959
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	5.10¢	5.10¢	5.10¢	5.10¢
Cold-rolled sheets	6.275	6.275	6.275	6.275
Galvanized sheets (10 ga.)	6.875	6.875	6.875	6.875
Hot-rolled strip	5.10	5.10	5.10	5.10
Cold-rolled strip	7.425	7.425	7.425	7.425
Plate	5.30	5.30	5.30	5.30
Plates, wrought iron	14.00	14.00**	14.00**	13.55
Stainl's C-R strip (No. 302)	52.00	52.00	52.00	52.00
Tin and Terneplate: (per base box)				
Tinplate (1.50 lb.) coke	$10.65	$10.65	$10.65	$10.65
Tin plates, electro (0.50 lb.)	9.35	9.35	9.35	9.35
Special coated mfg. ternes	9.90	9.90	9.90	9.90
Bars and Shapes: (per pound)				
Merchants bar	5.675¢	5.675¢	5.675¢	5.675¢
Cold finished bar	7.65	7.65	7.65	7.65
Alloy bar	6.725	6.725	6.725	6.725
Structural shapes	5.50	5.50	5.50	5.50
Stainless bars (No. 302)	46.75	46.75	46.75	45.00
Wrought iron bars	14.90	14.90	14.90	14.90
Wires: (per pound)				
Bright wire	8.00¢	8.00¢	8.00¢	8.00¢
Rails: (per 100 lb.)				
Heavy rails	$5.75	$5.75	$5.75	$5.75
Light rails	6.725	6.725	6.725	6.725
Semifinished Steel: (per net ton)				
Rerolling billets	$80.00	$80.00	$80.00	$80.00
Slabs, rerolling	80.00	80.00	80.00	80.00
Forging billets	99.50	99.50	99.50	99.50
Alloys, blooms, billets, slabs	119.00	119.00	119.00	119.00
Wire Rods and Skelp: (per pound)				
Wire rods	6.40¢	6.40¢	6.40¢	6.40¢
Skelp	5.05	5.05	5.05	5.05
Finished Steel Composite: (per pound)				
Base price	6.196¢	6.196¢	6.196¢	6.196¢

Finished Steel Composite
Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

	Mar. 8 1960	Mar. 1 1960	Feb. 9 1960	Mar. 10 1959
Pig Iron (per gross ton)				
Foundry, del'd Phila.	$70.57	$70.57	$70.57	$70.57
Foundry, Southern Cin'ti	73.87	73.87	73.87	73.87
Foundry, Birmingham	62.50	62.50	62.50	62.50
Foundry, Chicago	66.50	66.50	66.50	66.50
Basic, del'd Philadelphia	70.07	70.07	70.07	70.07
Basic, Valley furnace	66.00	66.00	66.00	66.00
Malleable, Chicago	66.50	66.50	66.50	66.50
Malleable, Valley	66.50	66.50	66.50	66.50
Ferromanganese, 74-76 pct Mn, cents per lb‡	11.00	11.00	11.00	12.25
Pig Iron Composite: (per gross ton)				
Pig iron	$66.41	$66.41	$66.41	$66.41
Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	$34.50	$36.50	$42.50	$44.50
No. 1 steel, Phila. area	35.50	35.50	40.50	37.50
No. 1 steel, Chicago	31.50	31.50	38.75	41.50
No. 1 bundles, Detroit	31.50*	32.50	39.50	37.50
Low phos., Youngstown	38.50*	40.50	46.50	47.50
No. 1 mach'y cast, Pittsburgh	52.50*	53.50	55.50	51.50
No. 1 mach'y cast, Phila.	51.50	51.50	54.50	49.50
No. 1 mach'y cast, Chicago	53.50	53.50	59.50	56.50
Steel Scrap Composite: (per gross ton)				
No. 1 hvy. melting scrap	$33.83*	$34.50	$40.58	$41.17
No. 2 bundles	21.83	21.83	26.50	29.00
Coke: Connellsville: (per net ton at oven)				
Furnace coke, prompt	$14.75-15.50	$14.75-15.50	$14.75-15.50	$14.50-15.50
Foundry coke, prompt	18.50	18.50	18.50	18.50
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electrolytic, Conn.	33.00	33.00	33.00	31.50
Copper, Lake, Conn.	33.00	33.00	33.00	31.50
Tin, Straits, N. Y.	100.00*	100.00	100.875	102.00
Zinc, East St. Louis	13.00	13.00	13.00	11.00
Lead, St. Louis	11.80	11.80	11.80	11.30
Aluminum, virgin ingot	28.10	28.10	28.10	26.80
Nickel, electrolytic	74.00	74.00	74.00	74.00
Magnesium, ingot	36.00	36.00	36.00	36.00
Antimony, Laredo, Tex.	29.50	29.50	29.50	29.50

† Tentative. ‡ Average. ** Revised.

Pig Iron Composite
Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo and Birmingham.

Steel Scrap Composites
Average of No. 1 heavy melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

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Has Scrap Market Hit Bottom?

Some dealers and brokers believe the market is nearing a turning point.

But all the signs of weakness continue and many others are pessimistic.

■ Has the scrap market hit bottom? Or are more declines coming? Dealers and brokers are divided in their opinions. Some believe prices have reached — or neared — the turning point. Others feel the market can drift along for months without improvement. And there's pessimism that prices will also drift lower.

The signs of a weak market are numerous. Mill purchases are still limited. Some dealers are selling scrap to buyers out of their area at a sacrifice. Brokers are covering old orders at lower prices. Export orders are not strong at the moment.

Export May Help—On the hopeful side, there are a few encouraging factors. In some markets, poor weather and low prices have dried up supplies—especially of the No. 2 grades. If so, prices for these grades could rebound.

Export activity seems ready to spurt. Japanese mills should come in with second quarter orders. There are estimates almost 60 cargoes or above 530,000 tons will be wanted. While down from first quarter orders by about 25 pct, this tonnage should stimulate export sales.

Pittsburgh — The market stumbled again as railroad lists showed up the continued lack of demand. On an early list, No. 1 railroad heavy melting was down $9. Some grades were off as much as $12 from last month's lists. Brokers still feel there is room for downward movement in prices of the best scrap grades. But there are signs the No. 2 grades are scraping bottom. Stocks of No. 2 bundles are low. The flow of bundles from the east has just about stopped.

Chicago — Prices drifted downward in some grades, with electric furnace scrap showing the heaviest loss—off $2 a ton. Purchases by mills showed some revival. New orders were written on turnings, some electric furnace material, and small purchases of steelmaking grades. The general outlook of the market continues weak. Some out-of-the-area orders are being written at reduced prices.

Philadelphia — Spot buying of single carloads at existing prices kept No. 1 heavy melting, No. 2 heavy melting, and No. 2 bundles at last week's levels. But No. 1 dealer bundles were down $1. Low phos grades and electric furnace bundles also declined. Dealers feel the market may be near bottom. But there's little hope for any improvement for months.

New York—The market remains quiet, with no changes in price. There's some opinion the market is touching bottom. But some dealers see little or no improvement through March. By April, the dealers maintain, export business will be the key factor in the market.

Detroit — Prices go on slipping down. Brokers and dealers in this market look for a declining market through March, with prices falling possibly $3 during the month.

Cleveland—The market declined another $2 in the Valley as the first open buy in months was made at $38 for No. 1 dealer scrap. Two other production scrap buys were made at $1 higher. Brokers are now covering previous buys at $2 under purchase prices. The sales are helping dealer inventories.

St. Louis—The weaker tone in the market continues. Mills are showing very little interest in buying. Sales are for limited tonnages and at lower prices. Some dealers feel the market is nearing bottom.

Cincinnati — Prices of prime grades were off another 50 cents on buys by one area consumer. Another major mill is staying out of the market. As a result, shippers are looking upriver for orders. Some are going into Pittsburgh at $1 to $2 a ton sacrifices. No. 1 dealer bundles were incorrectly quoted in the March 3 issue. They should have been $32.50.

Birmingham—The market is still slow with prices of openhearth, electric furnace, and foundry grades dropping another $1 a ton. Dealers outside the area, along the Tennessee River, are now offering scrap in this market.

Buffalo — Prices fell on limited tonnage buys of prime grades. No. 1 heavy melting and No. 1 dealer bundles were down $1 a ton. No. 2 heavy melting declined $2 a ton.

Boston—The market is still lackluster. Demand is poor. Prices are lower in some cases, strictly on a nominal basis. The heavy snowstorm last week cut activity and dropped prices as much as $3 to $4 a ton.

West Coast — Prices slid down $3 a ton in both Los Angeles and San Francisco. But the trade believes further declines are likely.

Houston — Gloom continues among dealers and brokers with the market weak. No. 2 bundles dropped $1 a ton. Export sales are limited.

SCRAP PRICES *(Effective March 8, 1960)*

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Pittsburgh

No. 1 hvy. melting	$34.00 to $35.00
No. 2 hvy. melting	29.00 to 30.00
No. 1 dealer bundles	36.00 to 37.00
No. 1 factory bundles	42.00 to 43.00
No. 2 bundles	25.00 to 26.00
No. 1 busheling	34.00 to 35.00
Machine shop turn.	19.00 to 20.00
Shoveling turnings	24.00 to 25.00
Cast iron borings	23.00 to 24.00
Low phos. punch'gs plate	43.00 to 44.00
Heavy turnings	30.00 to 31.00
No. 1 RR hvy. melting	39.00 to 40.00
Scrap rails, random lgth.	52.00 to 53.00
Rails 2 ft and under	55.00 to 56.00
RR specialties	48.00 to 49.00
No. 1 machinery cast.	52.00 to 53.00
Cupola cast.	47.00 to 48.00
Heavy breakable cast.	45.00 to 46.00
Stainless	
18-8 bundles and solids	230.00 to 235.00
18-8 turnings	115.00 to 120.00
430 bundles and solids	125.00 to 130.00
410 turnings	60.00 to 65.00

Chicago

No. 1 hvy. melting	$31.00 to $32.00
No. 2 hvy. melting	27.00 to 28.00
No. 1 dealer bundles	31.00 to 32.00
No. 1 factory bundles	36.00 to 37.00
No. 2 bundles	17.00 to 18.00
No. 1 busheling	31.00 to 32.00
Machine shop turn.	14.00 to 15.00
Mixed bor. and turn.	16.00 to 17.00
Shoveling turnings	16.00 to 18.00
Cast iron borings	16.00 to 17.00
Low phos. forge crops	45.00 to 46.00
Low phos. punch'gs plate, ¼ in. and heavier	41.00 to 42.00
Low phos. 2 ft and under	39.00 to 40.00
No. 1 RR hvy. melting	34.00 to 35.00
Scrap rails, random lgth.	46.00 to 47.00
Rerolling rails	54.00 to 55.00
Rails 2 ft and under	54.00 to 55.00
Angles and splice bars	45.00 to 46.00
RR steel car axles	51.00 to 52.00
RR couplers and knuckles	42.00 to 43.00
No. 1 machinery cast.	53.00 to 54.00
Cupola cast.	45.00 to 46.00
Cast iron wheels	41.00 to 42.00
Malleable	55.00 to 56.00
Stove plate	42.00 to 43.00
Steel car wheels	42.00 to 43.00
Stainless	
18-8 bundles and solids	215.00 to 222.50
18-8 turnings	115.00 to 120.00
430 bundles and solids	115.00 to 120.00
430 turnings	55.00 to 60.00

Philadelphia Area

No. 1 hvy. melting	$35.00 to $36.00
No. 2 hvy. melting	31.00 to 32.00
No. 1 dealer bundles	38.00 to 39.00
No. 2 bundles	22.00 to 23.00
No. 1 busheling	38.00 to 39.00
Machine shop turn.	18.00 to 19.00
Mixed bor. short turn.	20.00 to 21.00
Cast iron borings	18.00 to 19.00
Shoveling turnings	20.00 to 21.00
Clean cast. chem. borings	26.00 to 27.00
Low phos. 5 ft and under	39.00 to 40.00
Low phos. 2 ft punch'gs	42.00 to 43.00
Elec. furnace bundles	39.00 to 40.00
Heavy turnings	30.00 to 31.00
RR specialties	46.00 to 47.00
Rails, 18 in. and under	63.00 to 64.00
Cupola cast.	41.00 to 42.00
Heavy breakable cast.	43.00 to 44.00
Cast iron car wheels	46.00 to 47.00
Malleable	63.00 to 64.00
No. 1 machinery cast.	51.00 to 52.00

Cincinnati

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$31.00 to $32.00
No. 2 hvy. melting	26.00 to 27.00
No. 1 dealer bundles	31.00 to 32.00
No. 2 bundles	20.00 to 21.00
Machine shop turn.	15.00 to 16.00
Shoveling turnings	18.00 to 19.00
Cast iron borings	18.00 to 19.00
Low phos. 18 in. and under	44.00 to 45.00
Rails, random length	48.00 to 49.00
Rails, 18 in. and under	55.00 to 56.00
No. 1 cupola cast.	43.00 to 44.00
Hvy. breakable cast.	37.00 to 38.00
Drop broken cast.	53.00 to 54.00

Youngstown

No. 1 hvy. melting	$37.00 to $38.00
No. 2 hvy. melting	27.00 to 28.00
No. 1 dealer bundles	37.00 to 38.00
No. 2 bundles	22.00 to 23.00
Machine shop turn.	16.00 to 17.00
Shoveling turnings	20.00 to 21.00
Low phos. plate	38.00 to 39.00

Cleveland

No. 1 hvy. melting	$33.50 to $34.50
No. 2 hvy. melting	23.50 to 24.50
No. 1 dealer bundles	33.50 to 34.50
No. 1 factory bundles	40.00 to 41.00
No. 2 bundles	19.00 to 20.00
No. 1 busheling	33.50 to 34.50
Machine shop turn.	13.00 to 14.00
Mixed bor. and turn.	17.00 to 18.00
Shoveling turnings	17.00 to 18.00
Cast iron borings	17.00 to 18.00
Cut structural & plates, 2 ft & under	40.00 to 41.00
Drop forge flashings	33.50 to 34.50
Low phos. punch'gs plate	34.50 to 35.50
Foundry steel, 2 ft & under	35.00 to 36.00
No. 1 RR hvy. melting	40.00 to 41.00
Rails 2 ft and under	57.00 to 58.00
Rails 18 in. and under	61.00 to 62.00
Steel axle turnings	24.00 to 25.00
Railroad cast.	55.00 to 56.00
No. 1 machinery cast.	55.00 to 56.00
Stove plate	48.00 to 49.00
Malleable	58.00 to 59.00
Stainless	
18-8 bundles	210.00 to 220.00
18-8 turnings	90.00 to 100.00
430 bundles	105 to 115.00

Buffalo

No. 1 hvy. melting	$31.00 to $32.00
No. 2 hvy. melting	27.00 to 28.00
No. 1 busheling	32.00 to 33.00
No. 1 dealer bundles	31.00 to 32.00
No. 2 bundles	22.00 to 23.00
Machine shop turn.	15.00 to 16.00
Mixed bor. and turn.	16.00 to 17.00
Shoveling turnings	19.00 to 20.00
Cast iron borings	16.00 to 17.00
Low phos. plate	40.00 to 41.00
Structurals and plate, 2 ft and under	40.00 to 41.00
Scrap rails, random lgth.	38.00 to 39.00
Rails 2 ft and under	48.00 to 49.00
No. 1 machinery cast.	48.00 to 49.00
No. 1 cupola cast.	44.00 to 45.00

St. Louis

No. 1 hvy. melting	$33.00 to $34.00
No. 2 hvy. melting	31.00 to 32.00
No. 1 dealer bundles	34.00 to 35.00
No. 2 bundles	21.00 to 22.00
Machine shop turn.	13.00 to 14.00
Shoveling turnings	15.00 to 16.00
Cast iron borings	23.00 to 24.00
No. 1 RR hvy. melting	37.00 to 38.00
Rails, random lengths	44.00 to 45.00
Rails, 18 in. and under	47.00 to 48.00
Angles and splice bars	42.00 to 43.00
RR specialties	42.00 to 43.00
Cupola cast.	49.00 to 50.00
Heavy breakable cast.	37.00 to 38.00
Stove plate	40.00 to 41.00
Cast iron car wheels	39.00 to 40.00
Rerolling rails	54.00 to 55.00
Unstripped motor blocks	39.00 to 40.00

Birmingham

No. 1 hvy. melting	$31.00 to $32.00
No. 2 hvy. melting	26.00 to 27.00
No. 1 dealer bundles	31.00 to 32.00
No. 2 bundles	21.00 to 22.00
No. 1 busheling	37.00 to 38.00
Machine shop turn.	21.00 to 22.00
Shoveling turnings	22.00 to 23.00
Cast iron borings	12.00 to 13.00
Electric furnace bundles	37.00 to 38.00
Elec. furnace, 3 ft & under	35.00 to 36.00
Bar crops and plate	41.00 to 42.00
Structural and plate, 2 ft.	40.00 to 41.00
No. 1 RR hvy. melting	34.00 to 35.00
Scrap rails, random lgth.	47.00 to 48.00
Rails, 18 in. and under	53.00 to 54.00
Angles and splice bars	44.00 to 45.00
Rerolling rails	54.00 to 55.00
No. 1 cupola cast.	49.00 to 50.00
Stove plate	49.00 to 50.00
Cast iron car wheels	41.00 to 42.00
Unstripped motor blocks	38.00 to 39.00

New York

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$31.00 to $32.00
No. 2 hvy. melting	22.00 to 23.00
No. 2 dealer bundles	16.00 to 17.00
Machine shop turnings	9.00 to 10.00
Mixed bor. and turn.	10.00 to 11.00
Shoveling turnings	11.00 to 12.00
Clean cast. chem. borings	21.00 to 22.00
No. 1 machinery cast.	39.00 to 40.00
Mixed yard cast.	36.00 to 37.00
Heavy breakable cast.	37.00 to 38.00
Stainless	
18-8 prepared solids	200.00 to 205.00
18-8 turnings	85.00 to 90.00
430 prepared solids	85.00 to 90.00
430 turnings	20.00 to 25.00

Detroit

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$29.00 to $30.00
No. 2 hvy. melting	16.00 to 17.00
No. 1 dealer bundles	31.00 to 32.00
No. 2 bundles	15.00 to 16.00
No. 1 busheling	29.00 to 30.00
Drop forge flashings	29.00 to 30.00
Machine shop turn.	11.00 to 12.00
Mixed bor. and turn.	13.00 to 14.00
Shoveling turnings	13.00 to 14.00
Cast iron borings	13.00 to 14.00
Heavy breakable cast.	37.00 to 38.00
Mixed cupola cast.	43.00 to 44.00
Automotive cast.	49.00 to 50.00
Stainless	
18-8 bundles and solids	200.00 to 205.00
18-8 turnings	70.00 to 75.00
430 bundles and solids	90.00 to 95.00

Boston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$27.00 to $28.00
No. 2 hvy. melting	22.00 to 23.00
No. 1 dealer bundles	27.00 to 28.00
No. 2 bundles	11.00 to 12.00
No. 1 busheling	27.00 to 28.00
Machine shop turn.	5.00 to 6.00
Shoveling turnings	8.00 to 9.00
Clean cast. chem. borings	14.50 to 15.50
No. 1 machinery cast.	39.00 to 40.00
Mixed cupola cast.	32.00 to 33.00
Heavy breakable cast.	31.00 to 32.00

San Francisco

No. 1 hvy. melting	$35.00
No. 2 hvy. melting	31.00
No. 1 dealer bundles	31.00
No. 2 bundles	20.00
Machine shop turn.	15.00
Cast iron borings	15.00
No. 1 cupola cast.	46.00

Los Angeles

No. 1 hvy. melting	$35.00
No. 2 hvy. melting	32.00
No. 1 dealer bundles	31.00
No. 2 bundles	16.00
Machine shop turn.	16.00
Shoveling turnings	16.00
Cast iron borings	16.00
Elec. furn. 1 ft and under (foundry)	45.00
No. 1 cupola cast.	42.00

Seattle

No. 1 hvy. melting	$35.00
No. 2 hvy. melting	33.00
No. 2 bundles	22.00
No. 1 cupola cast.	36.00
Mixed yard cast.	36.00

Hamilton, Ont.

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$32.25
No. 2 hvy. melting	28.25
No. 1 dealer bundles	32.25
No. 2 bundles	24.00
Mixed steel scrap	24.25
Bush., new fact., prep'd.	32.25
Bush., new fact., unprep'd	26.25
Machine shop turn.	14.00
Short steel turn.	17.00
Mixed bor. and turn.	13.00
Cast scrap	$46.50 to 48.00

Houston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$37.00
No. 2 hvy. melting	34.00
No. 2 bundles	22.00
Machine shop turn.	16.00
Shoveling turnings	20.00
Cut structural plate 2 ft & under	$43.50 to $44.50
Unstripped motor blocks	32.00 to 33.00
Cupola cast.	39.00 to 40.00
Heavy breakable cast.	29.00 to 30.00

Aluminum Extruders Want Price Probe

Another Yates Committee investigation may follow Extruders Council price complaint.

Charges against producers are under study in several areas of government.

■ Major U. S. aluminum producers may come under scrutiny of the Yates Committee again.

This group (Subcommittee 3 of the Select Committee on Small Business) first met in 1957 and in 1958. Under Congressman Sidney R. Yates, (D., Ill.) it launched an investigation of the aluminum industry.

A lot of charges and denials were made, but beyond that, the committee made no follow up.

Extruders Charge — The issue that may put the Yates Committee back in business was raised last week by the Aluminum Extruders Council. The independents struck out, with no warning, at the Big Three—Aluminum Co. of America, Reynolds Metals Co., and Kaiser Aluminum and Chemical Co. The complaint: The Big Three is selling primary aluminum in Europe at lower prices than in the U. S.

Initially, the trade was puzzled. The pricing practice has been standard for some time. In fact, the spread has been greater than it is now. The producers say they are not prime factors in these markets and are only meeting competition.

What's Next? — The extruders say that pig costs 26¢ per lb in the U. S., but can be bought for 23¼¢ in foreign ports, with the U. S. producer paying about 1¢ per lb for foreign insurance.

An extruder spokesman announced that copies of the complaint were being sent to Congressman Yates and the U. S. Attorney General.

Watchful Waiting—Just about a year ago, the extruders filed a complaint against the producers with the Dept. of Justice. Early this week, a department spokesman said it is "studying" the complaint. This is a standard reply.

However, a Washington source notes significantly that the Justice Dept. clearly has not yet dropped the case, that perhaps something may yet come of it.

Yates' Comment—Congressman Yates gave a stock reply that he would study the extruders' issues. Then, he left Washington. Early this week it was learned that his staff people have been in contact with aluminum people in government. Possibly a recommendation may be on his desk when the Congressman returns.

The extruders' gripe is not the only one. The Aluminum Smelters Research Institute has been fighting what it calls promiscuous scrap exports. It has kept Congressman Yates informed of every step. One ASRI member says more hearings by the Yates Committee look like a sure thing to him.

Other Factors—Are there other reasons why the extruders raised the issue at this time? One member of the Council suggests the group should have done it when the producers raised prices back in December, that this action is remedial.

Another extruder says he suspects the producers might be ready to raise prices again, that this might be a deterring factor. But most of the trade considers this unlikely.

More Opinions—A smelter suggests that despite the fact that selling for lower prices in a foreign market is a long-standing practice, it might never have been widely known except for the extruders' complaints.

A Government official suggests extruders don't really expect the producers to cut domestic prices. But he notes that extruder pressure was the biggest force in initiating the first Yates hearings.

Tin prices for the week: March 2—101.125; March 3—101.00; March 4—100.75; March 7—100.625; March 8—100.50*.
* Estimate.

Monthly Average Metal Prices

(Cents per lb except as noted)

Average prices of the major nonferrous metals in FEBRUARY based on quotations appearing in THE IRON AGE, were as follows:

Electrolytic copper, del'd Conn. Valley	33.00
Copper, Lake	33.00
Straits, Tin, New York	101.125
Zinc, E. St. Louis	12.90
Lead, St. Louis	11.80
Aluminum ingot	28.10

Note: Quotations are on going prices

Primary Prices

(cents per lb)	current price	last price	date of change
Aluminum pig	26.00	24.70	12/17/59
Aluminum Ingot	28.10	26.30	12/17/59
Copper (E)	33.00	30-33	11/12/59
Copper (CS)	35.00	33.00	12/23/59
Copper (L)	33.00	31.50	11/6/59
Lead, St. L.	11.80	12.30	12/21/59
Lead, N. Y.	12.00	12.50	12/21/59
Magnesium Ingot	38.00	34.50	8/13/56
Magnesium pig	35.25	33.75	8/13/56
Nickel	74.00	64.50	12/6/58
Titanium sponge	150-160	162-182	8/1/59
Zinc, E. St. L.	13.00	12.50	1/8/60
Zinc, N. Y.	13.50	13.00	1/8/60

ALUMINUM: 99% Ingot COPPER: (E) = electrolytic, (CS) = custom smelters, electrolytic. (L) = lake. LEAD: common grade. MAGNESIUM: 99.8% pig Velasco, Tex. NICKEL: Port Colborne, Canada. ZINC: prime western. TIN: See above; Other primary prices, pg. 177.

MILL PRODUCTS

(Cents per lb unless otherwise noted)

ALUMINUM

(Base 30,000 lb, f.o.b. customer's plant)

Flat Sheet (Mill Finish and Plate)

("F" temper except 6061-0)

Alloy	.038	.048-.061	.077-.096	.136-.250
1100, 3003	47.8	47.3	46.2	45.1
5052	54.2	53.0	50.8	49.2
6061-0	51.0	49.8	47.9	46.0

Extruded Solid Shapes

Factor	6063 T-5	6062 T-6
1-17	44.7-46.2	53.2-60.8
18-32	45.2-46.8	57.7-79.9
33-38	48.8-51.4	83.3-94.5
39-44	58.7-62.4	99.9-121.C

Screw Machine Stock—2011-T-3

Size"	¼	⅝-½	¾-1	1¼-1½
Price	62.0	61.2	59.7	57.3

Roofing Sheet, Corrugated

(Per sheet, 26" wide base, 16,000 lb)

Length"→	72	96	120	144
.019 gage	$1.411	$1.884	$2.353	$2.823
.024 gage	1.762	2.349	2.937	3.524

MAGNESIUM

(F.o.b. shipping pt., carload frt. allowed)

Sheet and Plate

Type↓ Gage→	.250 3.00	.250-2.00	.188	.081	.032
AZ31B Stand. Grade	.....	67.9	69.0	77.9	103.1
AZ31B Spec.	.....	93.3	96.9	108.7	171.3
Tread Plate	.....	70.6	71.7	.....	.....
Tooling Plate	73.0	.....	.....	.....	.....

Extruded Shapes

factor→	6-8	12-14	24-26	36-38
Comm. Grade. (AZ31C)	65.3	65.3	66.1	71.5
Spec. Grade... (AZ31B)	84.6	85.7	90.6	104.2

Alloy Ingot

AZ91B (Die Casting)..... 37.25 (delivered)
AZ63A, AZ92A, AZ91C (Sand Casting) 40.75 (Velasco, Tex.)

NICKEL, MONEL, INCONEL

(Base prices f.o.b. mill)

	"A" Nickel	Monel	Inconel
Sheet, CR	138	120	138
Strip, CR	124	108	138
Rod, bar, HR	107	89	109
Angles, HR	107	89	109
Plates, HR	130	110	126
Seamless tube	157	129	200
Shot, blocks	...	87	...

COPPER, BRASS, BRONZE

(Freight included in 5000 lbs)

	Sheet	Wire	Rod	Tube
Copper	57.13	.....	54.86	58.32
Brass, Yellow	50.57	50.86	50.26	54.23
Brass, Low	53.53	53.82	53.22	57.09
Brass, R L	54.58	54.87	54.27	58.14
Brass, Naval	55.12	.....	48.68	58.78
Munts Metal	53.20	.....	48.26	.....
Comm. Bs.	56.17	56.46	55.86	59.48
Mang. Bs.	58.86	.....	52.21	.....
Phos. Bs. 5%	77.44	.....	78.19	.....

Free Cutting Brass Rod..... 36.00

TITANIUM

(Base prices f.o.b. mill)

Sheet and strip, commercially pure, $6.75-$13.00; alloy, $13.40-$17.00. Plate, HR, commercially pure, $5.25-$9.00; alloy, $8.00-$10.00. Wire, rolled and/or drawn, commercially pure, $5.55-$6.05; alloy, $5.55-$9.00; Bar, HR or forged, commercially pure, $4.00-$4.50; alloy, $4.00-$6.25; billets, HR, commercially pure, $3.20-$3.70; alloy, $3.20-$4.75.

PRIMARY METAL

(Cents per lb unless otherwise noted)

Antimony, American, Laredo, Tex.. 29.50
Beryllium Aluminum 5% Be, Dollars per lb contained Be $74.75
Beryllium copper, per lb conta'd Be.$43.00
Beryllium 97% lump or beads, f.o.b. Cleveland, Reading $71.50
Bismuth, ton lots .....$ 2.25
Cadmium, del'd .....$ 1.50
Calcium, 99.9% small lots .....$ 4.55
Chromium, 99.8% metallic base ...$ 1.31
Cobalt, 97-99% (per lb) ...$1.75 to $1.82
Germanium, per gm, f.o.b. Miami, Okla., refined .....29.95 to 36.95
Gold, U. S. Treas., per troy oz.....$35.00
Indium, 99.9%, dollars per troy oz. $ 2.25
Iridium, dollars per troy oz....$75 to $85
Lithium, 98% .....$9.00 to $12.00
Magnesium sticks, 10,000 lb. 57.00
Mercury, dollars per 76-lb flask f.o.b. New York .....$211 to $214
Nickel oxide sinter at Buffalo, N. Y., or other U. S. points of entry, contained nickel 69.60
Palladium, dollars per troy oz..$24 to $26
Platinum, dollars per troy oz...$82 to $85
Rhodium .....$137 to $140
Silver ingots (¢ per troy oz.).....91.375
Thorium, per kg. $43.00
Vanadium .....$ 3.65
Zirconium sponge .....$ 5.00

REMELTED METALS

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5 ingot
- No. 115 ..... 30.75
- No. 120 ..... 29.75
- No. 123 ..... 28.75

80-10-10 ingot
- No. 305 ..... 35.25
- No. 315 ..... 33.00

88-10-2 ingot
- No. 210 ..... 44.00
- No. 215 ..... 40.75
- No. 245 ..... 36.00

Yellow ingot
- No. 405 ..... 24.75

Manganese bronze
- No. 421 ..... 29.25

Aluminum Ingot

(Cents per lb del'd 30,000 lb and over)

95-5 aluminum-silicon alloys
- 0.30 copper max. 25.75-26.00
- 0.60 copper max. 25.50-25.75

Piston alloys (No. 132 type)..28.00-29.00
No. 12 alum. (No. 2 grade)...24.75-25.25
108 alloy 25.25-25.75
195 alloy 27.75-28.75
13 alloy (0.60 copper max.)...25.75-26.00
AXS-679 (1 pct zinc) 25.00-26.00

(Effective Mar. 8, 1960)

Steel deoxidizing aluminum notch bar granulated or shot
- Grade 1—95-97½% 25.25-26.25
- Grade 2—92-95% 24.00-25.00
- Grade 3—90-92% 23.00-24.00
- Grade 4—85-90% 22.50-23.50

SCRAP METAL

Brass Mill Scrap

(Cents per pound, add 1¢ per lb for shipments of 20,000 lb and over)

	Heavy	Turnings
Copper	29	28¼
Yellow brass	22¼	20¼
Red brass	25⅝	25
Comm. bronze	26½	26
Mang. bronze	20⅝	20
Free cutting rod ends.	21¼	

Customs Smelters Scrap

(Cents per pound carload lots, delivered to refinery)

- No. 1 copper wire 28
- No. 2 copper wire 24½
- Light copper 22¼
- *Refinery brass 22½
- Copper bearing material 22

*Dry copper content.

Ingot Makers Scrap

(Cents per pound carload lots, delivered to refinery)

- No. 1 copper wire 28
- No. 2 copper wire 24½
- Light copper 22½
- No. 1 composition 21½
- No. 1 comp. turnings 21
- Hvy. yellow brass solids 15½
- Brass pipe 15
- Radiators 16½

Aluminum

- Mixed old cast. ..... 14½—15½
- Mixed new clips ..... 16½—17½
- Mixed turnings, dry ..... 15 —16

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Copper and Brass

- No. 1 copper wire ..... 23 —23½
- No. 2 copper wire ..... 20½—21
- Light copper ..... 18 —18½
- Auto radiators (unsweated). 12½—13
- No. 1 composition ..... 16½—17
- No. 1 composition turnings.. 15½—16
- Cocks and faucets ..... 13 —13½
- Clean heavy yellow brass ... 11¾—12¼
- Brass pipe ..... 13½—14
- New soft brass clippings .... 14 —14½
- No. 1 brass rod turnings .... 11½—12

Aluminum

- Alum. pistons and struts .... 7½— 8
- Aluminum crankcase ..... 11¼—11¾
- 1100 (2s) aluminum clippings 15 —15½
- Old sheet and utensils ..... 11¼—11¾
- Borings and turnings ..... 7 — 7½
- Industrial castings ..... 11¼—11¾
- 2020 (24S) clippings ..... 12½—13

Zinc

- New zinc clippings ..... 7 — 7¼
- Old zinc ..... 4½— 5
- Zinc routings ..... 3¼— 3½
- Old die cast scrap ..... 2¾— 3

Nickel and Monel

- Pure nickel clippings 52-54
- Clean nickel turnings 40
- Nickel anodes 52-54
- Nickel rod ends 52-54
- New Monel clippings 28-29
- Clean Monel turnings 20-23
- Old sheet Monel 24-26
- Nickel silver clippings, mixed 18
- Nickel silver turnings, mixed 15

Lead

- Soft scrap lead ..... 8 — 8¼
- Battery plates (dry) ..... 3 — 3¼
- Batteries, acid free ..... 2 — 2¼

Miscellaneous

- Block tin ..... 75 —76
- No. 1 pewter ..... 55 —56
- Auto babbitt ..... 39 —40
- Mixed common babbitt ..... 9¾—10¼
- Solder joints ..... 13¼—13¾
- Siphon tops 41
- Small foundry type ..... 9¾—10¼
- Monotype ..... 9¾—10¼
- Lino. and stereotype ..... 8¾— 9
- Electrotype ..... 7½— 7¾
- Hand picked type shells .... 5¼— 5¾
- Lino. and stereo. dross ..... 2¼— 2¾
- Electro dross ..... 2¼— 2¾

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BILLETS, BLOOMS, SLABS			PILING	SHAPES STRUCTURALS			STRIP					
		Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton	Sheet Steel	Carbon	Hi Str. Low Alloy	Carbon Wide-Flange	Hot-rolled	Cold-rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot-rolled	Alloy Cold-rolled
EAST	Bethlehem, Pa.			$119.00 *B3*		5.55 *B3*	8.10 *B3*	5.55 *B5*						
	Buffalo, N. Y.	$80.00 *R3, B3*	$99.50 *R3, B3*	$119.00 *R3, B3*	6.50 *B3*	5.55 *B3*	8.10 *B3*	5.55 *B3*	5.10 *B3*	7.425 *S10, R7*	7.575 *B3*			
	Phila., Pa.									7.875 *P15*				
	Harrison, N. J.													15.55 *C11*
	Conshohocken, Pa.		$104.50 *A2*	$126.00 *A2*					5.15 *A2*		7.575 *A2*			
	New Bedford, Mass.									7.875 *R6*				
	Johnstown, Pa.	$80.00 *B3*	$99.50 *B3*	$119.00 *B3*		5.55 *B3*	8.10 *B3*							
	Boston, Mass.									7.975 *T8*				
	New Haven, Conn.									7.875 *D1*				
	Baltimore, Md.									7.425 *T8*				15.90 *T8*
	Phoenixville, Pa.					5.55 *P2*		5.55 *P2*						
	Sparrows Pt., Md.								5.10 *B3*		7.575 *B3*			
	New Britain, Bridgeport, Wallingford, Conn.			$119.00 *N8*						7.875 *W1,S7*				
	Pawtucket, R. I. Worcester, Mass.									7.975 *N7, A5*				15.90 *N7* 15.70 *T8*
MIDDLE WEST	Alton, Ill.								5.30 *L1*					
	Ashland, Ky.								5.10 *A7*		7.575 *A7*			
	Canton-Massillon, Dover, Ohio		$102.00 *R3*	$119.00 *R3,* $114.00 *T5*						7.425 *G4*		10.80 *G4*		
	Chicago, Franklin Park, Evanston, Ill.	$80.00 *U1, R3*	$99.50 *U1, R3,W8*	$119.00 *U1, R3,W8*	6.50 *U1*	5.50 *U1, W8,P13*	8.05 *U1, Y1,W8*	5.50 *U1*	5.10 *W8, N4,A1*	7.525 *A1,T8, M8*	7.575 *W8*		8.40 *W8, S9,I3*	15.55 *A1, S9,G4,T8*
	Cleveland, Ohio									7.425 *A5,J3*		10.75 *A5*	8.40 *J3*	
	Detroit, Mich.			$119.00 *R5*					5.10 *G3, M2*	7.425 *M2, S1, D1,P11*	7.575 *G3*	10.80 *S1*		
	Anderson, Ind.									7.425 *G4*				
	Gary, Ind. Harbor, Indiana	$80.00 *U1*	$99.50 *U1*	$119.00 *U1, Y1*		5.50 *U1, I3*	8.05 *U1, J3*	5.50 *I3*	5.10 *U1, I3,Y1*	7.425 *Y1*	7.575 *U1, I3,Y1*	10.90 *Y1*	8.40 *U1, Y1*	
	Sterling, Ill.	$80.00 *N4*				5.50 *N4*	7.75 *N4*	5.50 *N4*	5.20 *N4*					
	Indianapolis, Ind.									7.575 *R5*				15.70 *R5*
	Newport, Ky.								5.10 *A9*				8.40 *A9*	
	Niles, Warren, Ohio Sharon, Pa.		$99.50 *Sl2 C10*	$119.00 *C10,S1*					5.10 *R3, S1*	7.425 *R3, T4,S1*	7.575 *R3, S1*	10.80 *R3, S1*	8.40 *S1*	15.55 *S1*
	Owensboro, Ky.	$80.00 *G5*	$99.50 *G5*	$119.00 *G5*										
	Pittsburgh, Midland, Butler, Aliquippa, McKeesport, Pa.	$80.00 *U1, P6*	$99.50 *U1, C11,P6*	$119.00 *U1, C11,B7*	6.50 *U1*	5.50 *U1, J3*	8.05 *U1, J3*	5.50 *U1*	5.10 *P6*	7.425 *J3,B4* 7.525 *E3*			8.40 *S9*	15.55 *S9*
	Weirton, Wheeling, Follansbee, W. Va.				6.50 *U1, W3*	5.50 *W3*	-	5.50 *W3*	5.10 *W3*	7.425 *W5*	7.575 *W3*	10.80 *W3*		
	Youngstown, Ohio	$80.00 *R3*	$99.50 *Y1, C10*	$119.00 *Y1*			8.05 *Y1*		5.10 *U*	7.425 *Y1,R5*	7.575 *U1, Y1*	10.95 *Y1*	8.40 *U1, Y1*	15.55 *R5, Y1*
WEST	Fontana, Cal.	$90.50 *K1*	$109.00 *K1*	$140.00 *K1*		6.30 *K1*	8.85 *K1*	6.45 *K1*	5.825 *K1*	9.20 *K1*				
	Geneva, Utah		$99.50 *C7*			5.50 *C7*	8.05 *C7*							
	Kansas City, Mo.					5.60 *S2*	8.15 *S2*						8.65 *S2*	
	Los Angeles, Torrance, Cal.		$109.00 *B2*	$139.00 *B2*		6.20 *C7, B2*	8.75 *B2*		5.85 *C7, B2*	9.30 *C1,R5*			9.60 *B2*	17.75 *J3*
	Minnequa, Colo.					5.80 *C6*			6.20 *C6*	9.375 *C6*				
	Portland, Ore.					6.25 *O2*								
	San Francisco, Niles, Pittsburg, Cal.		$109.00 *B2*			6.15 *B2*	8.70 *B2*		5.85 *C7, B2*					
	Seattle, Wash.		$109.00 *B2*			6.25 *B2*	8.80 *B2*		6.10 *B2*					
SOUTH	Atlanta, Ga.					5.70 *A8*			5.10 *A8*					
	Fairfield, Ala. City, Birmingham, Ala.	$80.00 *T2*	$99.50 *T2*			5.50 *T2 R3,C16*	8.05 *T2*		5.10 *T2, R3,C16*		7.575 *T2*			
	Houston, Lone Star, Texas		$104.50 *S2*	$124.00 *S2*		5.60 *S2*	8.15 *S2*						8.65 *S2*	

(Effective Mar. 8, 1960)

STEEL PRICES

Italics identify producers listed in key at end of table. **Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.**

		SHEETS								WIRE ROD	TINPLATE†		
		Hot-rolled *18* ga. & hvyr.	Cold-rolled	Galvanized (Hot-dipped)	Enameling	Long Terne	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.		Cokes* *1.25*-lb. base box	Electro** *0.25*-lb. base box	Hallowware Enameling 29 ga.
EAST	Buffalo, N. Y.	5.10 *B3*	6.275 *B3*				7.525 *B3*	9.275 *B3*		6.40 *W6*	† Special coated mfg. terne deduct 35¢ from 1.25-lb. coke base box price, 0.75 lb./0.25 lb. add 55¢. Can-making quality BLACKPLATE 55 to 128 lb. deduct $2.20 from 1.25 lb. coke base box. * COKES: 1.50-lb. add 25¢. **ELECTRO: 0.50-lb. add 25¢; 0.75-lb. add 65¢; 1.00-lb. add $1.00. Differential 1.00 lb./0.25 lb. add 65¢.		
	Claymont, Del.												
	Coatesville, Pa.												
	Conshohocken, Pa.	5.15 *A2*	6.325 *A2*				7.575 *A2*						
	Harrisburg, Pa.												
	Hartford, Conn.												
	Johnstown, Pa.‡									6.40 *B3*			
	Fairless, Pa.	5.15 *U1*	6.325 *U1*				7.575 *U1*	9.325 *U1*			$10.50 *U1*	$9.20 *U1*	
	New Haven, Conn.												
	Phoenixville, Pa.												
	Sparrows Pt., Md.	5.10 *B3*	6.275 *B3*	6.875 *B3*			7.525 *B3*	9.275 *B3*	10.025 *B3*	6.50 *B3*	$10.40 *B3*	$9.10 *B3*	
	Worcester, Mass.									6.70 *A5*			
	Trenton, N. J.												
MIDDLE WEST	Alton, Ill.									6.60 *L1*			
	Ashland, Ky.	5.10 *A7*		6.875 *A7*	6.775 *A7*		7.525 *A7*						
	Canton-Massillon, Dover, Ohio			6.875 *R1, R3*									
	Chicago, Joliet, Ill.	5.10 *W8, A1*					7.525 *U1, W8*			6.40 *A5, R3,W8*			
	Sterling, Ill.									6.50 *N4, K2*			
	Cleveland, Ohio	5.10 *R3, J3*	6.275 *R3, J3*	7.65 *R3**	6.775 *R3*		7.525 *R3, J3*	9.275 *R3, J3*		6.40 *A5*			
	Detroit, Mich.	5.10 *G3, M2*	6.275 *G3, M2*				7.525 *G3*	9.275 *G3*					
	Newport, Ky.	5.10 *A9*	6.275 *A9*										
	Gary, Ind. Harbor, Indiana	5.10 *U1, I3,Y1*	6.275 *U1, I3,Y1*	6.875 *U1, I3*	6.775 *U1, I3,Y1*	7.225 *U1*	7.525 *U1, Y1,I3*	9.275 *U1, Y1*		6.40 *Y1*	$10.40 *U1, Y1*	$9.10 *I3, U1,Y1*	7.85 *U1, Y1*
	Granite City, Ill.	5.20 *G2*	6.375 *G2*	6.975 *G2*								$9.20 *G2*	7.95 *G2*
	Kokomo, Ind.			6.975 *C9*						6.50 *C9*			
	Mansfield, Ohio	5.10 *E2*	6.275 *E2*			7.225 *E2*							
	Middletown, Ohio		6.275 *A7*	6.875 *A7*	6.775 *A7*	7.225 *A7*							
	Niles, Warren, Ohio Sharon, Pa.	5.10 *R3, S1*	6.275 *R3*	6.875 *R3* 7.65 *R3**	6.775 *S1*	7.225 *S1**, *R3*	7.525 *R3, S1*	9.275 *R3,*				$9.10 *R3*	
	Pittsburgh, Midland, Butler, Donora, Aliquippa, McKeesport, Pa.	5.10 *U1, J3,P6*	6.275 *U1, J3,P6*	6.875 *U1, J3* 7.50 *E3**	6.775 *U1*		7.525 *U1, J3*	9.275 *U1, J3*	10.025 *U1, J3*	6.40 *A5, J3,P6*	$10.40 *U1, J3*	$9.10 *U1, J3*	7.85 *U1, J3*
	Portsmouth, Ohio	5.10 *P7*	6.275 *P7*							6.40 *P7*			
	Weirton, Wheeling, Follansbee, W. Va.	5.10 *W3, W5*	6.275 *W3, F3,W5*	6.875 *W3, W5* 7.50 *W3**		7.225 *W3, W5*	7.525 *W3*	9.275 *W3*			$10.40 *W5, W3*	$9.10 *W5, W3*	7.85 *W5*
	Youngstown, Ohio	5.10 *U1, Y1*	6.275 *Y1*	7.50 *J3**	6.775 *Y1*		7.525 *Y1*	9.275 *Y1*		6.40 *Y1*			
WEST	Fontana, Cal.	5.825 *K1*	7.40 *K1*				8.25 *K1*	10.40 *K1*			$11.05 *K1*	$9.75 *K1*	
	Geneva, Utah	5.20 *C7*											
	Kansas City, Mo.									6.65 *S2*			
	Los Angeles, Torrance, Cal.									7.20 *B2*			
	Minnequa, Colo.									6.65 *C6*			
	San Francisco, Niles, Pittsburg, Cal.	5.80 *C7*	7.225 *C7*	7.625 *C7*						7.20 *C7*	$11.05 *C7*	$9.75 *C7*	
SOUTH	Atlanta, Ga.												
	Fairfield, Ala. Alabama City, Ala.	5.10 *T2, R3*	6.275 *T2, R3*	6.875 *T2, R3*	6.775 *T2*					6.40 *T2,R3*	$10.50 *T2*	$9.20 *T2*	
	Houston, Texas									6.65 *S2*			

* Electrogalvanized sheets.

(Effective Mar. 8, 1960)

•7.425 at Sharon-Niles is 7.225

STEEL PRICES

Italics identify producers listed in key at end of table. **Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.**

		BARS						PLATES				WIRE
		Carbon† Steel	Reinforcing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfr'a. Bright
EAST	Bethlehem, Pa.				6.725 *B3*	9.025 *B3*	8.30 *B3*					
	Buffalo, N. Y.	5.675 *R3,B3*	5.675 *R3,B3*	7.70 *B5*	6.725 *B3,R3*	9.025 *B3,B5*	8.30 *B3*	5.30 *B3*				8.00 *W6*
	Claymont, Del.							5.30 *C4*		7.50 *C4*	7.95 *C4*	
	Coatesville, Pa.							5.30 *L4*		7.50 *L4*	7.95 *L4*	
	Conshohocken, Pa.							5.30 *A2*	6.375 *A2*	7.50 *A2*	7.95 *A2*	
	Harrisburg, Pa.							5.30 *P2*	6.375 *P2*			
	Milton, Pa.	5.825 *M7*	5.825 *M7*									
	Hartford, Conn.			8.15 *R3*		9.325 *R3*						
	Johnstown, Pa.	5.675 *B3*	5.675 *B3*		6.725 *B3*		8.30 *B3*	5.30 *B3*		7.50 *B3*	7.95 *B3*	8.00 *B3*
	Fairless, Pa.	5.825 *U1*	5.825 *U1*		6.875 *U1*							
	Newark, Camden, N. J.			8.10 *W10, P10*		9.20 *W10, P10*						
	Bridgeport, Putnam, Willimantic, Conn.			8.20 *W10* 8.15 *J3*	6.80 *N8*	9.175 *N8*						
	Sparrows Pt., Md.		5.675 *B3*					5.30 *B3*		7.50 *B3*	7.95 *B3*	8.10 *B3*
	Palmer, Worcester, Readville, Mansfield, Mass.			8.20 *B5, C14*		9.325 *A5,B5*						8.30 *A5, W6*
	Spring City, Pa.			8.10 *K4*		9.20 *K4*						
MIDDLE WEST	Alton, Ill.	5.675 *L1*										8.20 *L1*
	Ashland, Newport, Ky.							5.30 *A7,A9*		7.50 *A9*	7.95 *A7*	
	Canton, Massillon, Mansfield, Ohio	6.15* *R3*		7.65 *R3,R2*	6.725 *R3* 6.475 *T5*	9.025 *R3,R2* 8.775 *T5*		5.30 *E2*				
	Chicago, Joliet, Waukegan, Madison, Harvey, Ill.	5.675 *U1,R3, W8,N4,P13*	5.675 *U1,R3, N4,P13,W8* 5.875 *L1*	7.65 *A5, W10,W8, B5,L2,N9*	6.725 *U1,R3, W8*	9.025 *A5, W10,W8, L2,N8,B5*	8.30 *U1,W8, R3*	5.30 *U1,A1, W8,I3*	6.375 *U1*	7.50 *U1, W8*	7.95 *U1, W8*	8.00 *A5,R3, W8,N4, K2,W7*
	Cleveland, Elyria, Ohio	5.675 *R3*	5.675 *R3*	7.65 *A5,C13, C18*		9.025 *A5, C13,C18*	8.30 *R3*	5.30 *R3,J3*	6.375 *J3*		7.95 *R3,J3*	8.00 *A5, C13,C18*
	Detroit, Mich.	5.675 *G3*	5.675 *G3*	7.90 *P3* 7.85 *P8,B5* 7.65 *R5*	6.725 *R5,G3*	9.025 *R5* 9.225 *B5,P3, P8*	8.30 *G3*	5.30 *G3*		7.50 *G3*	7.95 *G3*	
	Duluth, Minn.											8.00 *A5*
	Gary, Ind. Harbor, Crawfordsville, Hammond, Ind.	5.675 *U1,I3, Y1*	5.675 *U1,I3, Y1*	7.65 *R3,J3*	6.725 *U1,I3, Y1*	9.025 *R3,M4*	8.30 *U1,Y1*	5.30 *U1,I3, Y1*	6.375 *J3, I1*	7.50 *U1, Y1*	7.95 *U1, Y1,I3*	8.10 *M4*
	Granite City, Ill.							5.40 *G2*				
	Kokomo, Ind.		5.775 *C9*									8.10 *C9*
	Sterling, Ill.	5.775 *N4*	5.775 *N4*					5.30 *N4*				8.10 *K2*
	Niles, Warren, Ohio Sharon, Pa.			7.65 *C10*	6.725 *C10,*	9.025 *C10*		5.30 *R3,S1*		7.50 *S1*	7.95 *R3, S1*	
	Owensboro, Ky.	5.675 *G5*			6.725 *G5*							
	Pittsburgh, Midland, Donora, Aliquippa, Pa.	5.675 *U1,J3*	5.675 *U1,J3*	7.65 *A5,B4, R3,J3,C11, W10,S9,C8, M9*	6.725 *U1,J3, C11,B7*	9.025 *A5, W10,R3,S9, C11,C8,M9*	8.30 *U1,J3*	5.30 *U1,J3*	6.375 *U1,J3*	7.50 *U1, J3,B7*	7.95 *U1, J3,B7*	8.00 *A5, J3,P6*
	Portsmouth, Ohio											8.00 *P7*
	Weirton, Wheeling, Follansbee, W. Va.							5.30 *W5*				
	Youngstown, Ohio	5.675 *U1,R3, Y1*	5.675 *U1,R3, Y1*	7.65 *A1,Y1, F2*	6.725 *U1,Y1*	9.025 *Y1,F2*	8.30 *U1,Y1*	5.30 *U1, R3,Y1*		7.50 *Y1*	7.95 *U1,Y1*	8.00 *Y1*
WEST	Emeryville, Fontana, Cal.	6.425 *J5* 6.375 *K1*	6.425 *J5* 6.375 *K1*		7.775 *K1*		9.00 *K1*	6.10 *K1*		8.30 *K1*	8.75 *K1*	
	Geneva, Utah							5.30 *C7*			7.95 *C7*	
	Kansas City, Mo.	5.925 *S2*	5.925 *S2*		6.975 *S2*		8.55 *S2*					8.25 *S2*
	Los Angeles, Torrance, Cal.	6.375 *C7,B2*	6.375 *C7,B2*	9.10 *R3,P14, S12*	7.775 *B2*	11.00 *P14, S12*	9.00 *B2*					8.95 *B2*
	Minnequa, Colo.	6.125 *C6*	6.125 *C6*					6.15 *C6*				8.25 *C6*
	Portland, Ore.	6.425 *O2*	6.425 *O2*									
	San Francisco, Niles, Pittsburg, Cal.	6.375 *C7* 6.425 *B2*	6.375 *C7* 6.425 *B2*				9.05 *B2*					8.95 *C7,C6*
	Seattle, Wash.	6.425 *B2,N6, A10*	6.425 *B2,A10*				9.05 *B2*	6.20 *B2*		8.40 *B2*	8.85 *B2*	
SOUTH	Atlanta, Ga.	5.875 *A8*	5.675 *A8*									8.00 *A8*
	Fairfield City, Ala. Birmingham, Ala.	5.675 *T2,R3, C16*	5.675 *T2,R3, C16*	8.25 *C16*			8.30 *T2*	5.30 *T2,R3*			7.95 *T2*	8.00 *T2,R3*
	Houston, Ft. Worth, Lone Star, Texas	5.925 *S2*	5.925 *S2*		6.975 *S2*		8.55 *S2*	5.40 *S2*		7.60 *S2*	8.05 *S2*	8.25 *S2*

† Merchant Quality—Special Quality 35¢ higher. (Effective Mar. 8, 1960) * Special Quality.

STEEL PRICES

Key to Steel Producers

With Principal Offices

A1 Acme Steel Co., Chicago
A2 Alan Wood Steel Co., Conshohocken, Pa.
A3 Allegheny Ludlum Steel Corp., Pittsburgh
A4 American Cladmetals Co., Carnegie, Pa.
A5 American Steel & Wire Div., Cleveland
A6 Angel Nail & Chaplet Co., Cleveland
A7 Armco Steel Corp., Middletown, Ohio
A8 Atlantic Steel Co., Atlanta, Ga.
A9 Acme-Newport Steel Co., Newport, Ky.
A10 Alaska Steel Mills, Inc., Seattle, Wash.

B1 Babcock & Wilcox Tube Div., Beaver Falls, Pa.
B2 Bethlehem Steel Co., Pacific Coast Div.
B3 Bethlehem Steel Co., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin, Inc., Harvey, Ill.
B6 Brook Plant, Wickwire-Spencer Steel Div., Birdsboro, Pa.
B7 A. M. Byers, Pittsburgh
B8 Braeburn Alloy Steel Corp., Braeburn, Pa.

C1 Calstrip Steel Corp., Los Angeles
C2 Carpenter Steel Co., Reading, Pa.
C4 Claymont Products Dept., Claymont, Del.
C6 Colorado Fuel & Iron Corp., Denver
C7 Columbia Geneva Steel Div., San Francisco
C8 Columbia Steel & Shafting Co., Pittsburgh
C9 Continental Steel Corp., Kokomo, Ind.
C10 Copperweld Steel Co., Pittsburgh, Pa.
C11 Crucible Steel Co. of America, Pittsburgh
C13 Cuyahoga Steel & Wire Co., Cleveland
C14 Compressed Steel Shafting Co., Readville, Mass.
C15 G. O. Carlson, Inc., Thorndale, Pa.
C16 Connors Steel Div., Birmingham
C18 Cold Drawn Steel Plant, Western Automatic Machine Screw Co., Elyria, O.

D1 Detroit Steel Corp., Detroit
D2 Driver, Wilbur B., Co., Newark, N. J.
D3 Driver Harris Co., Harrison, N. J.
D4 Dickson Weatherproof Nail Co., Evanston, Ill.

E1 Eastern Stainless Steel Corp., Baltimore
E2 Empire-Reeves Steel Corp., Mansfield, O.
E3 Enamel Products & Plating Co., McKeesport, Pa.

F1 Firth Sterling, Inc., McKeesport, Pa.
F2 Fitzsimons Steel Corp., Youngstown
F3 Follansbee Steel Corp., Follansbee, W. Va.

G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Corp., Detroit
G4 Greer Steel Co., Dover, O.
G5 Green River Steel Corp., Owenboro, Ky.

H1 Hanna Furnace Corp., Detroit

I2 Ingersoll Steel Div., New Castle, Ind.
I3 Inland Steel Co., Chicago, Ill.
I4 Interlake Iron Corp., Cleveland

J1 Jackson Iron & Steel Co., Jackson, O.
J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K1 Kaiser Steel Corp., Fontana, Calif.
K2 Keystone Steel & Wire Co., Peoria
K4 Keystone Drawn Steel Co., Spring City, Pa.

L1 Laclede Steel Co., St. Louis
L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.

M1 Mahoning Valley Steel Co., Niles, O.
M2 McLouth Steel Corp., Detroit
M3 Mercer Tube & Mfg. Co., Sharon, Pa.
M4 Mid States Steel & Wire Co., Crawfordsville, Ind.
M6 Mystic Iron Works, Everett, Mass.
M7 Milton Steel Products Div., Milton, Pa.
M8 Mill Strip Products Co., Chicago, Ill.
M9 Moltrup Steel Products Co., Beaver Falls, Pa.

N1 National Supply Co., Pittsburgh
N2 National Tube Div., Pittsburgh
N4 Northwestern Steel & Wire Co., Sterling, Ill.
N6 Northwest Steel Rolling Mills, Seattle
N7 Newman Crosby Steel Co., Pawtucket, R. I.
N8 Carpenter Steel of New England, Inc., Bridgeport, Conn.
N9 Nelson Steel & Wire Co.

O1 Oliver Iron & Steel Co., Pittsburgh
O2 Oregon Steel Mills, Portland

P1 Page Steel & Wire Div., Monessen, Pa.
P2 Phoenix Steel Corp., Phoenixville, Pa.
P3 Pilgrim Drawn Steel Div., Plymouth, Mich.
P4 Pittsburgh Coke & Chemical Co., Pittsburgh
P6 Pittsburgh Steel Co., Pittsburgh
P7 Portsmouth Div., Detroit Steel Corp., Detroit
P8 Plymouth Steel Co., Detroit
P9 Pacific States Steel Co., Niles, Cal.
P10 Precision Drawn Steel Co., Camden, N. J.
P11 Production Steel Strip Corp., Detroit
P13 Phoenix Mfg. Co., Joliet, Ill.
P14 Pacific Tube Co.
P15 Philadelphia Steel and Wire Corp.

R1 Reeves Steel & Mfg. Div., Dover, O.
R2 Reliance Div., Eaton Mfg. Co., Massillon, O.
R3 Republic Steel Corp., Cleveland
R4 Roebling Sons Co., John A., Trenton, N. J.
R5 Jones & Laughlin Steel Corp., Stainless and Strip Div.
R6 Rodney Metals, Inc., New Bedford, Mass.
R7 Rome Strip Steel Co., Rome, N. Y.

S1 Sharon Steel Corp., Sharon Pa.
S2 Sheffield Steel Div., Kansas City
S3 Shenango Furnace Co., Pittsburgh
S4 Simonds Saw and Steel Co., Fitchburg, Mass.
S5 Sweet's Steel Co., Williamsport, Pa.
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S9 Superior Steel Div. of Copperweld Steel Co., Carnegie, Pa.
S10 Seneca Steel Service, Buffalo
S11 Southern Electric Steel Co., Birmingham
S12 Sierra Drawn Steel Corp., Los Angeles, Calif.
S13 Seymour Mfg. Co., Seymour, Conn.
S14 Screw and Bolt Corp. of America, Pittsburgh, Pa.

T1 Tonawanda Iron Div., N. Tonawanda, N. Y.
T2 Tennessee Coal & Iron Div., Fairfield
T3 Tennessee Products & Chem. Corp., Nashville
T4 Thomas Strip Div., Warren, O.
T5 Timken Steel & Tube Div., Canton, O.
T7 Texas Steel Co., Fort Worth
T8 Thompson Wire Co., Boston

U1 United States Steel Corp., Pittsburgh
U2 Universal Cyclops Steel Corp., Bridgeville, Pa.
U3 Ulbrich Stainless Steels, Wallingford, Conn.
U4 U. S. Pipe & Foundry Co., Birmingham

W1 Wallingford Steel Co., Wallingford, Conn.
W2 Washington Steel Corp., Washington, Pa.
W3 Weirton Steel Co., Weirton, W. Va.
W4 Wheatland Tube Co., Wheatland, Pa.
W5 Wheeling Steel Corp., Wheeling, W. Va.
W6 Wickwire Spencer Steel Div., Buffalo
W7 Wilson Steel & Wire Co., Chicago.
W8 Wisconsin Steel Div., S. Chicago, Ill.
W9 Woodward Iron Co., Woodward, Ala.
W10 Wyckoff Steel Co., Pittsburgh
W12 Wallace Barnes Steel Div., Bristol, Conn.

Y1 Youngstown Sheet & Tube Co., Youngstown, O.

PIPE AND TUBING

Base discounts (pct) f.o.b. mills. Base price about $200 per net ton.

STANDARD T. & C.	BUTTWELD														SEAMLESS							
	½ In.		¾ In.		1 In.		1¼ In.		1½ In.		2 In.		2½–3 In.		2 In.		2½ In.		3 In.		3½–4 In.	
	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
Sparrows Pt. *B3*	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50								
Youngstown *R3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Fontana *K1*	*10.75	*26.00	*7.75	*22.00	*4.25	*17.50	*1.75	*16.75	*1.25	*15.75	*0.75	*15.25	0.75	*15.50								
Pittsburgh *J3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Alton, Ill. *L1*	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50								
Sharon *M3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Fairless *N2*	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50								
Pittsburgh *N1*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Wheeling *W5*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Wheatland *W4*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Youngstown *Y1*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Indiana Harbor *Y1*	1.25	*14.0	4.25	*10.0	7.75	*5.50	10.25	*4.75	10.75	*3.75	11.25	*3.25	12.75	*3.50								
Lorain *N2*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
EXTRA STRONG PLAIN ENDS																						
Sparrows Pt. *B3*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50								
Youngstown *R3*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Fairless *N2*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50								
Fontana *K1*	*6.25		*2.25		0.75		1.25		1.75		2.25		2.75									
Pittsburgh *J3*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Alton, Ill. *L1*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50								
Sharon *M3*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Pittsburgh *N1*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Wheeling *W5*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Wheatland *W4*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Youngstown *Y1*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Indiana Harbor *Y1*	5.75	*8.0	9.75	*4.0	12.75	0.50	13.25	*0.75	13.75	0.25	14.25	0.75	14.75	*0.50								
Lorain *N2*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50

Threads only, buttweld and seamless, 2¼ pt. higher discount. Plain ends, buttweld and seamless, 3-in. and under, 5½ pt. higher discount.
Galvanized discounts based on zinc price range of over 9¢ to 11¢ per lb. East St. Louis. For each 2¢ change in zinc, discounts vary as follows: ½, ¾ and 1-in., 2 pt.; 1¼, 1½ and 2-in., 1½ pt.; 2½ and 3-in., 1 pt., e.g., zinc price range of over 13¢ to 15¢ would lower discounts on 2½ and 3-in. pipe by 2 points; zinc price in range over 7¢ to 9¢ would increase discounts. East St. Louis zinc price now 13.00¢ per lb.

(Effective Mar. 8, 1960)

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	per lb	SAE
18	4	1	—	—	$1.84	T-1
18	4	1	—	5	2.545	T-4
18	4	2	—	—	2.005	T-2
1.5	4	1.5	8	—	1.20	M-1
6	4	3	6	—	1.59	M-3
6	4	2	5	—	1.345	M-2
High-carbon chromium					.955	D-3, D-5
Oil hardened manganese					.505	O-2
Special carbon					.38	W-1
Extra carbon					.38	W-1
Regular carbon					.325	W-1

Warehouse prices on and east of Mississippi are 4¢ per lb higher. West of Mississippi, 6¢ higher.

CLAD STEEL

Base prices, cents per lb f.o.b.

	Cladding	Plate (*L4, C4, A3, J2*) 10 pct	Plate (*L4, C4, A3, J2*) 15 pct	Plate (*L4, C4, A3, J2*) 20 pct	Sheet (*I2*) 20 pct
Stainless Type	302	.....	.....	.....	37.50
	304	28.80	31.55	34.30	40.00
	316	42.20	46.25	50.25	58.75
	321	34.50	37.75	41.05	47.25
	347	40.80	44.65	48.55	57.00
	405	24.60	26.90	29.25	.....
	410	22.70	24.85	27.00	.....
	430	23.45	25.65	27.90	.....

CR Strip (S9) Copper, 10 pct, 2 sides, 44.20; 1 side, 36.80.

RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Tie Plates	Track Bolts Untreated
Bessemer *U1*	5.75	6.725	7.25	.....	.....	.....
Cleveland *R3*	.....	.....	.....	.....	.....	15.35
So. Chicago *R3*	.....	.....	.....	10.10	.....	.....
Ensley *T2*	5.75	6.725	.....	.....	.....	.....
Fairfield *T2*	.....	6.725	.....	10.10	6.875	.....
Gary *U1*	5.75	.....	.....	.....	6.875	.....
Huntington, *C16*	.....	6.725	.....	.....	.....	.....
Ind. Harbor *I3*	.....	.....	.....	10.10	.....	.....
Johnstown *B3*	.....	6.725	.....	.....	.....	.....
Joliet *U1*	.....	.....	7.25	.....	.....	.....
Kansas City *S2*	.....	.....	.....	10.10	.....	15.35
Lackawanna *B3*	5.75	6.725	7.25	.....	6.875	.....
Lebanon *B3*	.....	.....	7.25	.....	.....	15.35
Minnequa *C6*	5.75	7.225	7.25	10.10	6.875	15.35
Pittsburgh *S14*	.....	.....	.....	.....	.....	15.35
Pittsburgh *J3*	.....	.....	.....	10.10	.....	.....
Seattle *B2*	.....	.....	.....	.....	6.75	15.85
Steelton *B3*	5.75	.....	7.25	.....	6.875	.....
Struthers *Y1*	.....	.....	.....	10.10	.....	.....
Torrance *C7*	.....	.....	.....	.....	6.75	.....
Williamsport *S5*	.....	6.725	.....	.....	.....	.....
Youngstown *R3*	.....	.....	.....	10.10	.....	.....

COKE

	Net Ton
Furnace, beehive (f.o.b.) Connellsville, Pa.	$14.75 to $15.50
Foundry, beehive (f.o.b.)	$18.50
Foundry oven coke	
Buffalo, del'd	$33.25
Ironton, O., f.o.b.	30.50
Detroit f.o.b.	32.00
New England, del'd	33.55
New Haven, f.o.b.	31.00
Kearney, N. J., f.o.b.	31.25
Philadelphia, f.o.b.	31.00
Swedeland, Pa., f.o.b.	31.00
Painesville, Ohio, f.o.b.	32.00
Erie, Pa., f.o.b.	32.00
St. Paul, f.o.b.	31.25
St. Louis, f.o.b.	33.00
Birmingham, f.o.b.	30.35
Milwaukee, f.o.b.	32.00
Neville Is., Pa.	30.75

LAKE SUPERIOR ORES

51.50% Fe natural, delivered lower Lake ports. Interim prices for 1959 season. Freight changes for seller's account.

	Gross Ton
Openhearth lump	$12.70
Old range, bessemer	11.85
Old range, nonbessemer	11.70
Mesabi, bessemer	11.60
Mesabi, nonbessemer	11.45
High phosphorus	11.45

ELECTRICAL SHEETS

22-Gage F.o.b. Mill Cents Per Lb	Hot-Rolled (Cut Lengths)*	Cold-Reduced (Coiled or Cut Length) Semi-Processed	Cold-Reduced (Coiled or Cut Length) Fully Processed
Field	.....	9.875	.....
Armature	11.70	11.20	11.70
Elect.	12.40	11.90	12.40
Special Motor	.....	12.475	.....
Motor	13.55	13.05	13.55
Dynamo	14.65	14.15	14.65
Trans. 72	15.70	15.20	15.70
Trans. 65	16.30	.....	.....
		Grain Oriented	
Trans. 58	16.80	Trans. 80	19.70
Trans. 52	17.85	Trans. 73	20.20
		Trans. 66	20.70

Producing points: Aliquippa (*J3*); Beech Bottom (*W5*); Brackenridge (*A3*); Granite City (*G2*); Indiana Harbor (*I3*); Mansfield (*E2*); Newport, Ky. (*A9*); Niles, O. (*S1*); Vandergrift (*U1*); Warren, O. (*R3*); Zanesville, Butler (*A7*).

ELECTRODES

Cents per lb. f.o.b. plant, threaded, with nipples, unboxed.

GRAPHITE Diam. (In.)	GRAPHITE Length (In.)	GRAPHITE Price	CARBON* Diam. (In.)	CARBON* Length (In.)	CARBON* Price
24	84	27.25	40	100, 110	12.50
20	72	26.50	35	110	11.20
18	72	27.50	30	110	11.70
14	72	27.25	24	72	11.95
12	72	28.25	20	90	11.55
10	60	29.50	17	72	12.10
10	48	30.00	14	72	12.55
7	60	29.75	10	60	13.80
6	60	33.25	8	60	14.25
4	40	37.00			
3	40	39.25			
2½	30	41.50			
2	24	64.00			

* Prices shown cover carbon nipples.

REFRACTORIES

Fire Clay Brick

Carloads per 1000

Super duty, Mo., Pa., Md., Ky.	$185.00
High duty (except Salina, Pa., add $5.00)	140.00
Medium duty	125.00
Low duty (except Salina, Pa., add $2.00)	103.00
Ground fire clay, net ton, bulk	22.50

Silica Brick

Mt. Union, Pa., Ensley, Ala.	$158.00
Childs, Hays, Latrobe, Pa.	163.00
Chicago District	168.00
Western Utah	183.00
California	165.00
Super Duty Hays, Pa., Athens, Tex., Windham, Warren, O., Morrisville	163.00-168.00
Silica cement, net ton, bulk, Latrobe	29.75
Silica cement, net ton, bulk, Chicago	26.75
Silica cement, net ton, bulk, Ensley, Ala.	27.75
Silica cement, net ton, bulk, Mt. Union	25.75
Silica cement, net ton, bulk, Utah and Calif.	39.00

Chrome Brick

Per net ton

Standard chemically bonded, Balt.	$109.00
Standard chemically bonded, Curtiner, Calif.	119.00
Burned, Balt.	103.00

Magnesite Brick

Standard, Baltimore	$140.00
Chemically bonded, Baltimore	119.00

Grain Magnesite

St. ⅜ to ½-in. grains

Domestic, f.o.b. Baltimore in bulk.	$73.00
Domestic, f.o.b. Chewalah, Wash., Luning, Nev. in bulk	46.00
in sacks	52.00-54.00

Dead Burned Dolomite

Per net ton

F.o.b. bulk, producing points in: Pa., W. Va., Ohio	$16.75
Missouri Valley	15.60
Midwest	17.00

(Effective Mar. 8, 1960)

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard Q Coated Nails Col	Woven Wire Fence Col	"T" Fence Posts Col	Single Loop Bale Ties Col	Galv. Barbed and Twisted Barbless Wire Col	Merch. Wire Ann'ld ¢/lb.	Merch. Wire Galv. ¢/lb.
Alabama City *R3*	173	187	...	212	193	9.00	9.55
Aliquippa *J3****	173	190	...	...	198	9.00	9.675
Atlanta *A8***	175	192	...	214	198	8.75	9.425
Bartonsville *K2***	175	192	178	214	198	9.10	9.775
Buffalo *W6*	.....	.....	.....	.....	.....	9.00	9.55*
Chicago *N4***	173	190	177	212	196	9.00	9.70
Chicago *R3*	.....	.....	.....	.....	.....	9.00	9.55
Cleveland *A6*	.....	.....	.....	.....	.....	.....	.....
Cleveland *A5*	.....	.....	.....	.....	.....	9.00	.....
Crawf'dsv. *M4***	175	192	...	214	198	9.10	9.775
Donora, Pa. *A5*	173	187	...	212	193	9.00	9.55
Duluth *A5*	173	187	177	212	193	9.00	9.55
Fairfield, Ala. *T2*	173	187	...	212	193	9.00	9.55
Galveston *D4*	9.10‡	.....	.....	.....	.....	.....	.....
Houston *S2*	178	192	...	217	198	9.25	9.80†
Jacksonville *M4*	184-1	197	...	219	203	9.10	9.775
Johnstown *B3***	173	190	178	...	196	9.00	9.675
Joliet, Ill. *A5*	173	187	...	212	193	9.00	9.55
Kokomo *C9*	175	189	...	214	195*	9.10	9.65*
L. Angeles *B2****	.....	.....	.....	.....	.....	9.95	10.625
Kansas City *S2**	178	192	...	217	198*	9.25	9.80†
Minnequa *C6*	178	192	182	217	198†	9.25	9.80†
Palmer, Mass. *W6*	.....	.....	.....	.....	.....	9.30	9.85*
Pittsburg, Cal. *C7*	192	210	...	...	213	9.95	10.50
Rankin, Pa. *A5*	173	187	...	...	193	9.00	9.55
So. Chicago *R3*	173	187	...	...	193	8.65	9.20
S. San Fran. *C6*	.....	.....	...	236	.....	9.95	10.50†
SparrowsPt. *B3***	175	.....	...	214	198	9.10	9.775
Struthers, O. *Y1**	.....	.....	.....	.....	.....	8.85	9.20
Worcester *A5*	179	.....	.....	.....	.....	9.30	9.85
Williamsport *S5*	.....	.....	.....	.....	.....	.....	.....

* Zinc less than .10¢. *** .10¢ zinc.
** 11-12¢ zinc. † Plus zinc extras.
‡ Wholesalers only.

C-R SPRING STEEL

Cents Per Lb F.o.b. Mill	CARBON CONTENT 0.26-0.40	0.41-0.60	0.61-0.80	0.81-1.05	1.06-1.35
Anderson, Ind. *G4*	8.95	10.40	12.60	15.60	18.55
Baltimore, Md. *T8*	9.50	10.70	12.90	15.90	18.85
Bristol, Conn. *W12*	.....	10.70	12.90	16.10	19.30
Boston *T8*	9.50	10.70	12.90	15.90	18.85
Buffalo, N. Y. *R7*	8.95	10.40	12.60	15.60	18.55
Carnegie, Pa. *S9*	8.95	10.40	12.60	15.60	18.55
Chicago	.....	.....	.....	15.60	.....
Cleveland *A5*	8.95	10.40	12.60	15.60	18.55
Dearborn *S1*	9.05	10.50	12.70	.....	.....
Detroit *D1*	9.05	10.50	12.70	15.70	.....
Detroit *D2*	9.05	10.50	12.70	.....	.....
Dover, O. *C4*	8.95	10.40	12.60	15.60	18.55
Evanston, Ill. *M8*	9.05	10.40	12.60	.....	.....
Franklin Park, Ill. *T8*	9.05	10.40	12.60	15.60	18.55
Harrison, N. J. *C11*	.....	.....	12.90	16.10	19.30
Indianapolis *R3*	9.10	10.55	12.60	15.60	18.55
Los Angeles *C1*	11.15	12.60	14.80	17.80	.....
New Britain, Conn. *S7*	9.40	10.70	12.90	15.90	18.85
New Castle, Pa. *B4*	8.95	10.40	12.60	15.60	.....
New Haven, Conn. *D1*	9.40	10.70	12.90	15.90	.....
Pawtucket, R. I. *N7*	9.50	10.70	12.90	15.90	18.85
Riverdale, Ill. *A7*	9.05	10.40	12.60	15.60	18.55
Sharon, Pa. *S1*	8.95	10.40	12.60	15.60	18.55
Trenton, *R4*	.....	10.70	12.90	16.10	19.30
Wallingford *W1*	9.40	10.70	12.90	15.90	18.55
Warren, Ohio *T4*	8.95	10.40	12.60	15.60	18.75
Worcester, Mass. *A5*	9.50	10.70	12.90	15.90	18.85
Youngstown *R5*	9.10	10.55	12.60	15.60	18.55

BOILER TUBES

$ per 100 ft. carload lots cut 10 to 24 ft. F.o.b. Mill	Size OD-In.	Size B.W. Ga.	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
Babcock & Wilcox	2	13	40.28	47.21	35.74
	2½	12	54.23	63.57	48.13
	3	12	62.62	73.40	55.59
	3½	11	73.11	85.70	65.84
	4	10	97.08	113.80	88.10
National Tube	2	13	40.28	47.21	35.74
	2½	12	54.23	63.57	48.13
	3	12	62.62	73.40	55.59
	3½	11	73.11	85.70	65.84
	4	10	97.08	113.80	88.10
Pittsburgh Steel	2	13	40.28	47.21	.....
	2½	12	54.23	63.57	.....
	3	12	62.62	73.40	.....
	3½	11	73.11	85.70	.....
	4	10	97.08	113.80	.....

METAL POWDERS

Cents per lb, minimum truckload, delivered E. of Miss. River, unless otherwise noted.

Iron Powders

Compacting Powders

Electrolytic, imported, f.o.b.	29.50 to 33.00
Electrolytic, domestic	34.50
Sponge	11.50
Atomized	11.25
Hydrogen Reduced	11.25 to 12.00
Carbonyl	88.00
Welding Powders*	8.10
Cutting and Scarfing Powders*	9.10

Copper Powders

Molding Grades	
Electrolytic, domestic f.o.b. shipping point	49.25
Precipitated	47.50
Atomized	39.80 to 48.30
Hydrogen reduced, f.o.b.	49.25
Bronze	47.20 to 51.50
Chromium, electrolytic	$5.00
Lead	19.00
Manganese, f.o.b.	42.00
Molybdenum	$3.60 to $3.95
Nickel	$1.05 to $1.03
Nickel Silver	53.50
Nickel Steel	13.00
Solder	13¢ plus metal value
Stainless Steel, 302	$1.07
Stainless Steel, 316	$1.26
Steel, atomized, prealloyed, 4600 series	14.00 plus metal value
Tin	14¢ plus metal value
Titanium, 99.25+%, per lb., f.o.b.	$11.25
Tungsten	$3.15 (nominal)

* F.O.B., shipping point.

BOLTS, NUTS, RIVETS, SCREWS

(Base discount, f.o.b. mill)

Pct. Discounts

Bolts	1-4 Containers	5 Containers	20,000 Lb.	40,000 Lb.
Machine				
½" and smaller x 3" and shorter	55	57	61	62
⅝" diam. x 3" and shorter	47	49½	54	55
¾" thru 1" diam x 6" and shorter	37	39½	45	46
¾" thru 1" diam. longer than 6" and 1½" and larger x all lengths	31	34	40	41
Rolled thread, ½" and smaller x 3" and shorter	55	57	61	62
Carriage, lag, plow, tap, blank, step, elevator and fitting up bolts ½" and smaller x 6" and shorter	48	50½	55	56

Note: Add 25 pct for less than container quantity. Distributor prices are 5 pct less on bolts and square nuts.

Nuts, Hex, HP reg. & hvy.	Full case or Keg price
¾ in. or smaller	62
⅞ in. to 1½ in. inclusive	56
1⅝ in. and larger	51½
C. P. Hex, reg. & hvy.	
¾ in. or smaller	62
⅞ in. to 1½ in. inclusive	56
1⅝ in. and larger	51½
Hot Galv. Hex Nuts (All Types)	
¾ in. and smaller	41
Semi-finished Hex Nuts	
¾ in. or smaller	62
⅞ in. to 1½ in. inclusive	56
1⅝ in. and larger	51½
(Add 25 pct for broken case or keg quantities)	
Finished	
⅞ in. and smaller	65

Rivets	*Base per 100 lb*
½ in. and larger	$12.85
	Pct. Off List
7/16 in. and smaller	15

Cap Screws	*Discount (Packages)*
	Full Finished H. C. Heat Treat
New std. hex head, packaged	Full Case
⅝" diam. and smaller x 6" and shorter	54	42
¾", ⅞", and 1" diam. x 6" and shorter	38	23
⅝" diam. and smaller x longer than 6"	..	..
¾", ⅞", and 1" diam. x longer than 6"	..	..

	C-1018 Steel Full-Finished Cartons	Bulk
¼" through ⅝" dia. x 6" and shorter	59	48
¾" through 1" dia. x 6" and shorter	45	32

Minimum quantity—¼" through ⅝" diam., 15,000 pieces; 7/16" through ⅝" diam., 5,000 pieces; ¾" through 1" diam., 2,000 pieces.

Machine Screws & Stove Bolts

	Quantity	Discount Mach. Screws	Discount Stove Bolts
Plain Finish			
Cartons		60	60
Bulk			
To ¼" diam. incl.	25,000-and over	60	..
5/16 to ½" diam. incl.	15,000-200,000	60	..

Machine Screws & Stove Bolt Nuts

	Quantity	Discount Hex	Discount Square
In Cartons		16	19
In Bulk			
⅜" diam. & smaller	25,000-and over	15	16

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, frt allowed in quantity)

Copper	
Rolled elliptical, 18 in. or longer, 5000 lb lots	48.00
Electrodeposited	40.00
Brass, 80-20, ball anodes, 2000 lb or more	53.00
Zinc, ball anodes, 2000 lb lots	19.75
(for elliptical add 1¢ per lb)	
Nickel, 99 pct plus, rolled carton, 5000 lb	1.0225
(Rolled depolarized add 3¢ per lb)	
Cadmium, 5000 lb	1.30
Tin, ball anodes $1.05 per lb (approx.).	

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 100 lb drum	65.90
Copper sulphate, 100 lb bags, per cwt.	27.75
Nickel salts, single, 100 lb bags	36.00
Nickel chloride, freight allowed, 100 lb	45.00
Sodium cyanide, domestic, f.o.b. N. Y., 200 lb drums	23.70
(Philadelphia price 25.00)	
Zinc cyanide, 100 lb	60.75
Potassium cyanide, 100 lb drum N. Y.	45.50
Chromic acid, flake type, 10,000 lb or more	30.44

CAST IRON WATER PIPE INDEX

Birmingham	125.8
New York	138.5
Chicago	139.8
San Francisco-L. A.	148.6

Dec. 1955, value, Class B or heavier 5 in. or larger, bell and spigot pipe. Explanation: p. 57, Sept. 1, 1955, issue. Source: U. S. Pipe and Foundry Co.

STEEL SERVICE CENTERS

Metropolitan Price, dollars per 100 lb.

Cities	City Delivery‡ Charge	Sheets: Hot-Rolled (18 ga. & hvr.)	Sheets: Cold-Rolled (15 gage)	Sheets: Galvanized (10 gage)††	Strip: Hot-Rolled	Plates	Shapes: Standard Structural	Bars: Hot-Rolled (merchant)	Bars: Cold-Finished	Alloy Bars: Hot-Rolled 4615 As rolled	Alloy Bars: Hot-Rolled 4140 Annealed	Alloy Bars: Cold-Drawn 4615 As rolled	Alloy Bars: Cold-Drawn 4140 Annealed
Atlanta		8.59	9.87	10.13	8.91	9.29	9.40	9.39	13.24	.....	.....	.....	.....
Baltimore**	$.10	8.63	10.10	10.16	11.04	9.25	10.02	9.43	11.90	17.48	16.48	21.58	20.83
Birmingham**		9.43	10.20	10.46	10.41	9.29	9.50	9.89	13.14	16.76	.....	.....	.....
Boston**	.10	10.52	11.27	11.87	12.17	10.42	10.72	10.34	13.45	17.69	16.69	21.[illegible]	21.04
Buffalo**	.15	8.95	10.10	11.30	10.80	10.25	9.80	9.15	11.60	17.45	16.45	21.55	20.80
Chicago**	.15	8.69	10.35	11.10	10.35	8.62	9.28	8.79	10.80	17.10	16.10	19.70	20.45
Cincinnati**	.15	8.86	10.41	11.10	10.67	9.00	9.84	9.11	11.68	17.42	16.42	21.52	20.77
Cleveland**	.15	8.88[1]	10.03	11.29	10.66	9.07	9.90	9.11	11.40	17.21	16.21	21.31	20.56
Denver	.20	9.60	11.84	12.94	9.63	9.96	10.04	10.00	11.19	.....	.....	.....	20.84
Detroit**	.15	8.95	10.61	11.40	10.72	8.99	9.84	9.10	11.16	17.38	16.38	21.48	21.03
Houston**		9.67	10.60	12.19	11.28	9.47	9.34	9.13	13.10	17.50	16.55	21.55	20.85
Kansas City**	.15	9.36	11.02	11.50	11.02	9.25	9.95	9.46	11.72	17.17	15.87	21.87	21.12
Los Angeles**		9.95[1]	11.55	12.20	11.55	10.00	10.00	9.75	14.20	18.30	17.35	22.90	22.20
Memphis	.15	8.55	9.80	.....	8.60	8.93	9.01	8.97	12.11	.....	.....	.....	.....
Milwaukee**	.15	8.83	10.49	11.24	10.49	8.76	9.50	8.93	11.04	17.24	15.34	21.24	19.09
New York	.10	9.46	10.23	11.55	11.56	9.61	10.30	9.84	13.35	16.16	15.60	20.10	19.35
Norfolk	.20	8.20	.....	.....	8.90	8.65	9.20	8.90	10.70	.....	.....	.....	.....
Philadelphia	.10	9.25	9.35	10.99	11.20	9.65	9.95	9.60	12.05	16.58	15.58	20.08	19.33
Pittsburgh**	.15	8.88	10.03	11.18	10.64	8.83	9.51	9.00	11.40	17.10	16.10	19.70	20.45
Portland		10.00	11.75	13.30	11.95	11.50	11.10	9.85	15.30	18.50	17.45	20.75	20.25
San Francisco**	.10	11.00	11.95[2]	11.65	12.25	11.00	10.95	10.75	15.20	18.30	17.35	22.90	22.20
Seattle**		11.55	12.30	12.50	12.65	11.00	10.20	11.10	16.20	18.60	17.80	22.70	22.20
Spokane**	.15	11.70	12.45	12.65	13.30	11.15	11.35	11.75	16.35	17.75	17.95	21.58	22.35
St. Louis**	.15	8.79	10.73	11.48	10.45	8.73	9.40	8.90	11.43	17.48	16.48	21.58	19.33
St. Paul**	.15	9.19	9.74	10.89	10.81	9.10	9.78	9.27	11.64	.....	16.69	.....	21.04

Base Quantities (Standard unless otherwise keyed): Cold finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 4999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may be combined with each other for quantity. ** These cities are on net pricing. Prices shown are for 2000 lb item quantities of the following: Hot-rolled sheet—10 ga. x 36 x 96—120; Cold-rolled sheet—20 ga x 36 x 96—120; Galv. sheet—10 ga x 36—120; Hot-rolled strip—⅛" x 1"; Plate—¼" x 84"; Shapes—I-Beams 6 x 12.5; Hot-rolled bar—Rounds—⅝-2 15/16; Cold-finished bar—C 1018—1" rounds; Alloy bar—hot-rolled 4615—1⅝" to 2⅞"; cold drawn—15/16" to 2⅞" round; Hot-rolled 4140—⅝" to 2⅞" round, cold drawn—15/16" to 2⅞" round.

†† 13¢ zinc. ‡ Deduct for country delivery. [1] 15 ga. & heavier; [2] 14 ga. & lighter.

(Effective Mar. 8, 1960)

(Ferroalloy prices will next appear in the March 17 issue)

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

Producing Point	Basic	Fdry.	Mall.	Bess.	Low Phos.
Birdsboro, Pa. *B6*	68.00	68.50	69.00	69.50	.....
Birmingham *R3*	62.00	62.50*	.....	.....	.....
Birmingham *W9*	62.00	62.50*	66.50	.....	.....
Birmingham *U4*	62.00	62.50*	66.50	.....	.....
Buffalo *R3*	66.00	66.50	67.00	67.50	.....
Buffalo *H1*	66.00	66.50	67.00	67.50	71.50†
Buffalo *W6*	66.00	66.50	67.00	67.50	.....
Chester *P2*	68.00	68.50	69.00	.....	.....
Chicago *I4*	66.00	66.50	66.50	67.00	.....
Cleveland *A5*	66.00	66.50	66.50	67.00	71.00†
Cleveland *R3*	66.00	66.50	66.50	67.00	.....
Duluth *I4*	66.00	66.50	66.50	67.00	71.00†
Erie *I4*	66.00	66.50	66.50	67.00	71.00†
Everett *M6*	67.50	68.00	68.50	.....	.....
Fontana *K1*	75.00	75.50	.....	.....	.....
Geneva, Utah *C7*	66.00	66.50	.....	.....	.....
Granite City *G2*	67.90	68.40	68.90	.....	.....
Hubbard *Y1*	.....	.....	66.50	.....	.....
Ironton, Utah *C7*	66.00	66.50	.....	.....	.....
Midland *C11*	66.00	.....	.....	.....	.....
Minnequa *C6*	68.00	68.50	69.00	.....	.....
Monessen *P6*	66.00	.....	.....	.....	.....
Neville Is. *P4*	66.00	66.50	66.50	67.00	71.00†
N. Tonawanda *T1*	.....	66.50	67.00	67.50	.....
Sharpsville *S3*	66.00	.....	66.50	67.00	.....
So. Chicago *R3*	66.00	66.50	66.50	67.00	.....
So. Chicago *W8*	66.00	.....	66.50	67.00	.....
Swedeland *A2*	68.00	68.50	69.00	69.50	73.00†
Toledo *I4*	66-00	66.50	66.50	67.00	.....
Troy, N. Y. *R3*	68.00	68.50	69.00	69.50	73.00
Youngstown *Y1*	.....	.....	66.50	.....	.....

DIFFERENTIALS: Add, 75¢ per ton for each 0.25 pct silicon or portion thereof over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct) 50¢ per ton for each 0.25 pct manganese or portion thereof over 1 pct, $2 per ton for 0.50 to 0.75 pct nickel, $1 for each additional 0.25 pct nickel. Add $1.00 for 0.31-0.69 pct phos.

Silvery Iron: Buffalo (6 pct), *H1*, $79.25; Jackson *J1*, *I4*, (Globe Div.), $78.00; Niagara Falls (15.01-15.50), $101.00; Keokuk (14.01-14.50), $89.00; (15.51-16.00), $92.00. Add $1.00 per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 18 pct. Add $1.00 for each 0.50 pct manganese over 1.00 pct. Bessemer silvery pig iron (under .10 pct phos.): $64.00.

† Intermediate low phos.

STAINLESS STEEL

Base price cents per lb. f.o.b. mill

Product	201	202	301	302	303	304	316	321	347	403	410	416	430
Ingots, reroll.	22.75	24.75	24.00	26.25	—	28.00	41.25	33.50	38.50	—	17.50	—	17.75
Slabs, billets	28.00	31.50	29.00	32.75	33.25	34.50	51.25	41.50	48.25	—	22.25	—	22.50
Billets, forging	—	37.75	38.75	39.50	42.50	42.00	64.50	48.75	57.75	29.25	29.25	29.75	29.75
Bars, struct.	43.50	44.50	46.00	46.75	49.75	49.50	75.75	57.50	67.25	35.00	35.00	35.50	35.50
Plates	39.25	40.00	41.25	42.25	45.00	45.75	71.75	54.75	64.75	30.00	30.00	31.25	31.00
Sheets	48.50	49.25	51.25	52.00	56.75	55.00	80.75	65.50	79.25	40.25	40.25	31.75 48.25	40.75
Strip, hot-rolled	36.00	39.00	37.25	40.50	—	44.25	69.25	53.50	63.50	—	31.00	—	32.00
Strip, cold-rolled	45.00	49.25	47.50	52.00	56.75	55.00	80.75	65.50	79.25	40.25	40.25	42.50	40.75
Wire CF; Rod HR	—	42.25	43.50	44.25	47.25	47.00	71.75	54.50	63.75	33.25	33.25	33.75	33.75

STAINLESS STEEL PRODUCING POINTS:

Sheets: Midland, Pa., *C11;* Brackenridge, Pa., *A3;* Butler, Pa., *A7;* Vandergrift, Pa., *U1;* Washington, Pa., *W2, J2;* Baltimore, *E1;* Middletown, O., *A7;* Massillon, O., *R3;* Gary, *U1;* Bridgeville, Pa., *U2;* New Castle, Ind., *I2;* Detroit, *M2;* Louisville, O., *R5.*

Strip: Midland, Pa., *C11;* Waukegan, Cleveland, *A5;* Carnegie, Pa., *S9;* McKeesport, Pa., *F1;* Reading, Pa., *C2;* Washington, Pa., *W2;* W. Leechburg, Pa., *A3;* Bridgeville Pa., *U2;* Detroit, *M2;* Detroit, *S1;* Canton, Massillon, O., *R5;* Harrison, N. J., *D3;* Youngstown, *R5;* Sharon, Pa., *S1;* Butler, Pa., *A7,* Wallingford, Conn., *U3* (plus further conversion extras); *W1* (25¢ per lb. higher); Seymour, Conn., *S13,* (25¢ per lb. higher); New Bedford, Mass., *R6* Gary, *U1,* (25¢ per lb. higher); Baltimore, Md., *E1* (300 series only).

Bar: Baltimore, *A7;* S. Duquesne, Pa., *U1;* Munhall, Pa., *U1;* Reading, Pa., *C2;* Titusville, Pa., *U2;* Washington, Pa., *J2;* McKeesport, Pa., *U1, F1;* Bridgeville, Pa., *U2;* Dunkirk, N. Y., *A3;* Massillon, O., *R5;* S. Chicago, *U1;* Syracuse, N. Y., *C11;* Watervliet, N. Y., *A3;* Waukegan, *A5;* Canton, O., *T5, R3;* Ft. Wayne, *I4;* Detroit, *R5;* Gary, *U1;* Owensboro, Ky., *G5;* Bridgeport, Conn., *N8;* Ambridge, Pa., *B7.*

Wire: Waukegan, *A5;* Massillon, O., *R3;* McKeesport, Pa., *F1;* Ft. Wayne, *J4;* Newark, N. J. *D2;* Harrison, N. J., *D3;* Baltimore, *A7;* Dunkirk, *A3;* Monessen, *P1;* Syracuse, *C11;* Bridgeville, *U2;* Detroit, *R5;* Reading, Pa., *C2;* Bridgeport, Conn., *N8* (down to and including ¼").

Structurals: Baltimore, *A7;* Massillon, O., *R3;* Chicago, Ill., *J4;* Watervliet, N. Y., *A3;* Syracuse, *C11;* S. Chicago, *U1.*

Plates: Ambridge, Pa., *B7;* Baltimore, *E1;* Brackenridge, Pa., *A3;* Chicago, *U1;* Munhall, Pa., *U1;* Midland, Pa., *C11;* New Castle, Ind., *I2;* Middletown, *A7;* Washington, Pa., *J2;* Cleveland, Massillon, *R3;* Coatesville, Pa., *C15;* Vandergrift, Pa., *U1;* Gary, *U1.*

Forging billets: Ambridge, Pa., *B7;* Midland, Pa., *C11;* Baltimore, *A7;* Washington, Pa., *J2;* McKeesport, *F1;* Massillon, Canton, O., *R3;* Watervliet, *A3;* Pittsburgh, Chicago, *U1;* Syracuse, *C11;* Detroit, *R5;* Munhall, Pa., S. Chicago, *U1;* Owensboro, Ky., *G5;* Bridgeport, Conn., *N8;* Reading, Pa., *C2.*

(Effective Mar. 8, 1960)

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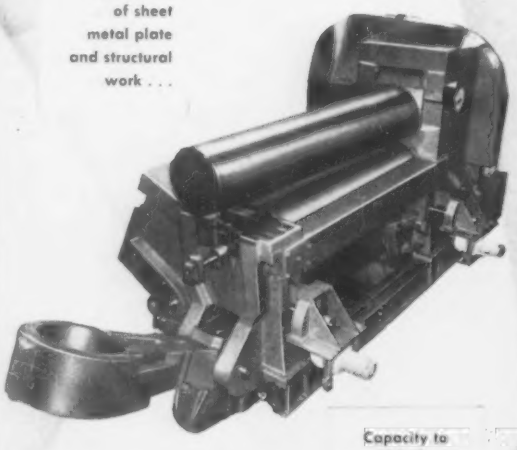

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EX-20

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(Any above items can be purchased separately)

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QU.	H.P.	MAKE	VOLTS	R.P.M.
1*	2550	Whse.	700	108/162
1*	2200	Whse.	600	92/132
1*	2000	G.E.	600	200/400
1*	2000	G.E.	350	230/350
1*	1750	G.E.	600	200/300
1*	750	Whse.	250	200/400
4*	700	Whse.	250	300/700
2*	645	S & S	300	1000
1	600	Whse.	250	110/220
2	235	Whse.	230	325/975
1	150	Whse.	230	400/1200
1	125	Whse.	230	450/900
1	35/110	G.E.	250	255/1650
1	75	Whse.	230	250/1000

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Qu.	H.P.	Make	Type	Volts	Speed
1	1750	G.E.	M-579B8	4800	1800
1	1500	G.E.	MT	6600	1187
1	800	Whse.	CW	550	1776
1	800	G.E.	MT-428	2200	450
1	600	Whse.	CW	220/440	900
1	600	Whse.	CW-4-32D-15	440	1778
1	550	Whse.	CW	440	252
1	500	Whse.	CW	550	350
1	300	A.C.	ANY	440/2300	720
1	300	G.E.	MTP561	2200	1800
1	250	G.E.	IM-16	220/440	875
1	250	A.C.	ANY	550	600
1	250	Cr. Wh.	Size 29Q	2300	350
1	250	G.E.	MT-424Y	4000	257
1	200	G.E.	IE-13B	220	1800
2	200	Whse.	CW-890	2300	1775
2	200	G.E.	IM-17A	2200	435
1	200	G.E.	IM	2200	580
1	125	G.E.	MT-557	220/440	1200
3	100	A.C.		440	695

SQUIRREL CAGE

1	500	G.E.	FT-559AY	2200	3600
2	500	Whse.	CSP-583H	440	3600
1	500	Whse.	CS-1115	2200	863/445
4	500	Whse.	CS-1216	2200	500
2	450	Ell.	F-3910	2200	1200
1	400	Whse.	CS-7151-610H	6600/4000	3585
1	300	Whse.	CS-1002	2300/440	600
1	250	Whse.	CS-875S	2200	1775
1	200	Whse.	CSP-581S	440	3450
2	200	Whse.	CS-855S D.P.	220/440	1750
1	200	Whse.	CS-873C	2200	1160
1	150	G.E.	FT-558	2200	875
1	150	Whse.	CS	440	580
1	125	Whse.	CS-764C	220/440	1160
3	100	Whse.	CS-760C	2200/440	1100
1	100	Whse.	B.B.CS-607	220/440	1780

SYNCHRONOUS

1	6000	G.E.	ATI .8	2200/6600	600
1	3500	G.E.	TS 1.0	4600/2300/4000	360
1	2000	G.E.	ATI	2300	900
1	1750	G.E.	ATI	2300	3600
1	1750	G.E.	TS	2300/4600	900
1	700	G.E.	TS .8P.F.	2300	1200
1	400	G.E.	TS-756S	2200	1200
2	350	G.E.	ATI 1.0P.F.	2300	150
1	325	G.E.	ATI 1.0P.F.	440	1800
2	300	El Mach.	BRKT	2200	1200

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Foreign Markets Good For Used Machines

A Midwest dealer says now is the time for dealers to sell old equipment to Latin American countries.

Steel firms in the U. S., Canada and South America are very interested in used machines.

▪ Steel mills can now get the highest prices since 1953 for their used equipment and there is a heavy demand for it piling up, according to a leading dealer.

Lou Kinderman of Niles, Ohio, one of the largest independents, says steel firms in the U. S., as well as Canada and South American countries, are sending in a continuous stream of inquiries on used equipment.

Sales Up—"Last year was my company's worst year since 1944 when it was started," says Mr. Kinderman. "But now things have picked up so well, it looks like this may be the best—at least since 1953. More and more companies this year should take the opportunity to retire some of their older equipment and put in newer, automated, high production units. This is one of their best bets to compete with low priced foreign labor.

"It also frees good, but outmoded equipment which Mexican and Latin American countries are glad to get. Mexican firms, for instance, simply haven't the dollars to buy our new equipment. They don't even want reconditioned equipment because they have lots of low priced labor and can do the rebuilding work cheaper themselves. The duty is generally almost equal to the price of the equipment, so it quickly gets out of sight in Mexico.

Long Distance—"We are getting phone calls daily from mill people abroad who want to come in to inspect equipment. But temporarily, bad weather is holding them up. You can't see the equipment buried under snow."

Europe has become kind of a lost market for used machinery. And, as in many another industry, is now competing against foreign manufacturers. Probably the next step will be competition within the U. S. Although there has not been too much of it so far on steel mill equipment.

Sales Offer—In South America, German steel mill equipment firms are now offering to finance part of the mill in order to get their machinery into it.

European used equipment is now even being offered in the U. S. for sale. But it is finding few takers because prices are high.

Heavy Equipment

M. S. Kaplan Co., Chicago, has purchased for liquidation $3 million worth of heavy mill equipment from the former Armor Plate Plant at Gary, Ind.

Major items include: Morgan 60 in. universal plate mill, McKay 90 in. plate leveler, straightening and flattening presses, conveyors and presses.

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AND ELECTRICAL EQUIPMENT

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Announcing

POWER STRUT DIVISION
VAN HUFFEL PRODUCTS, INC.
WARREN, OHIO

The Product lines of
POWER STRUT, INC.
DECOR PRODUCTS, INC.
Framingham, Mass.

have been acquired by

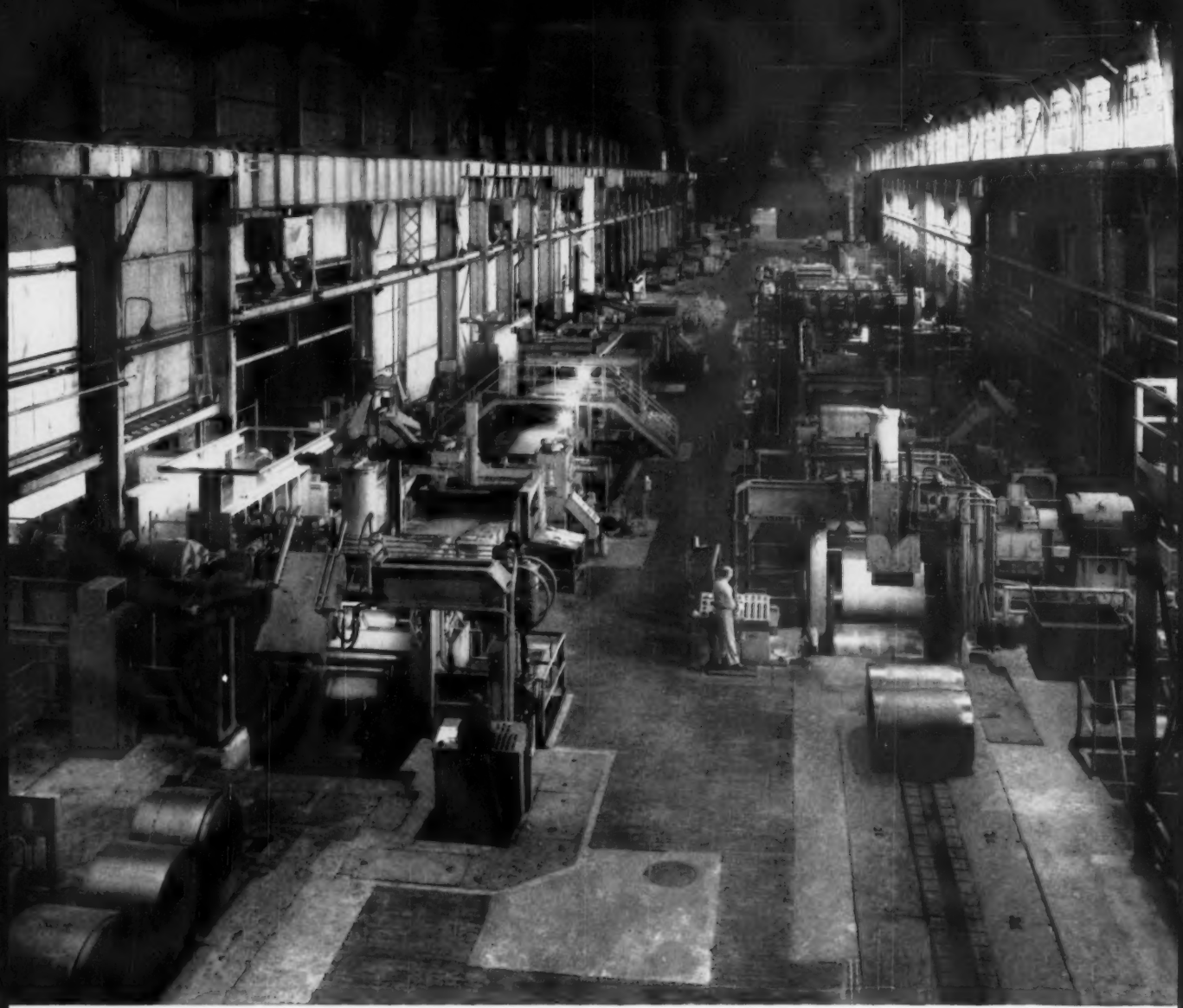
VAN HUFFEL PRODUCTS, INC.
A subsidiary of Van Huffel Tube Corporation, Warren, Ohio

Power Strut framing channels, fittings and accessories; Research and Industrial partitions, Decor movable walls, partitions and other products will be produced in Warren, Ohio by the Power Strut Division, Van Huffel Products, Inc.

The newly formed organization will continue to work with architects, engineers, mechanical and electrical contractors in the development of new uses where the basic idea of POWER STRUT CONTINUOUS SLOT FRAMING SYSTEM can play a distinct engineering and economic advantage.

VAN HUFFEL
TUBE CORPORATION, WARREN, OHIO

Where ideas take shape in metal



J&L gets new production versatility with two rugged Wean Shearing Lines

Jones & Laughlin Steel Corporation's Cleveland Works Division has added these modern Wean shearing lines to satisfy an increasingly wide range of customer requirements. Both lines can handle 30,000# coils up to 75" wide. The Upcut Shear Line (left) can side-trim and shear strip up to ⅜" thick, with cut-lengths varying from 48" to 500", at a maximum speed of 140 fpm.

The combination Flying Shear Line (right) shears strip up to ¼" in thickness, with maximum cut lengths of 288", at speeds up to 350 fpm. This high-speed Wean line also permits combinations of side-trimming, slitting, temper passing and shearing or recoiling operations.

If you are planning expansion or modernization of your hot rolled strip shearing facilities, a Wean representative will welcome the opportunity to discuss your requirements. Wean's *creative engineering* can mean new profits for you.

WEAN

THE WEAN ENGINEERING COMPANY, INC. • WARREN, OHIO

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E. W. BLISS COMPANY, Canton, Ohio

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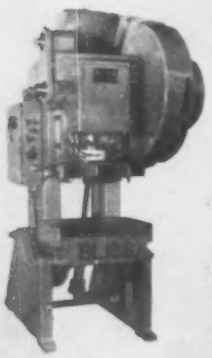
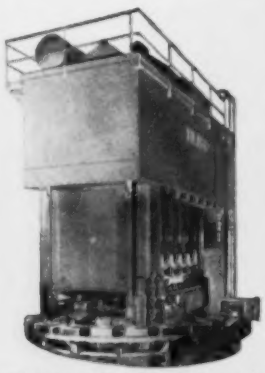
CONTAINER MACHINERY • CONTRACT MFG.



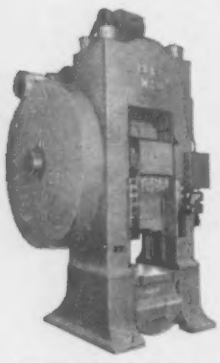
INCLINABLE PRESSES . . . in bench, single or double crank, modern enclosed design. With air friction or mechanical clutches, and whatever you need in cushions and feeds.

STRAIGHT SIDE PRESSES . . . eccentric and crankshaft models . . . any size . . . modern enclosed design, with whatever automatic features you want.

HIGH PRODUCTION PRESSES . . . specially designed for continuous high speed automatic operation. Up to 1000 spm. Available in a variety of sizes . . . and precision feeds.



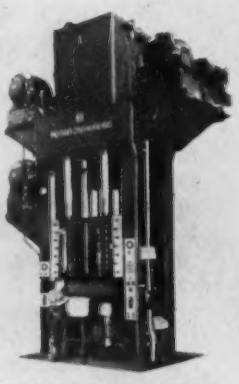
TRANSFER FEED PRESSES . . . for the ultimate in production. Bliss pioneered the development, now builds them for blank or coil stock work, with no limit on size.



KNUCKLE JOINT PRESSES . . . for slow, powerful application of pressure at near-bottom stroke. Bliss builds them from 75 to 10,000 tons capacity in 40 standard models for coining, embossing, extruding, sizing and swaging.

FORGING PRESSES . . . for production of turbine blades, crankshafts — hot forging, cold coining and other operations. Built in a number of sizes, from 300 to 4000 tons capacity, to standard and special design.

TOGGLE PRESSES . . . Double and triple action designs with quick advance and return speed features; modern electronic controls and automatic lubricating systems. From giant "automotive" sizes to compact units for small parts.



HYDRO-DYNAMIC® PRESSES . . . single action or double open rod construction or closed, 20 tons capacity to 35,000 or even more, standard design or special high speed models, electronic controls —Bliss has built them all.